"Twin Peeks" Show Coverage: Anaheim & Chicago!

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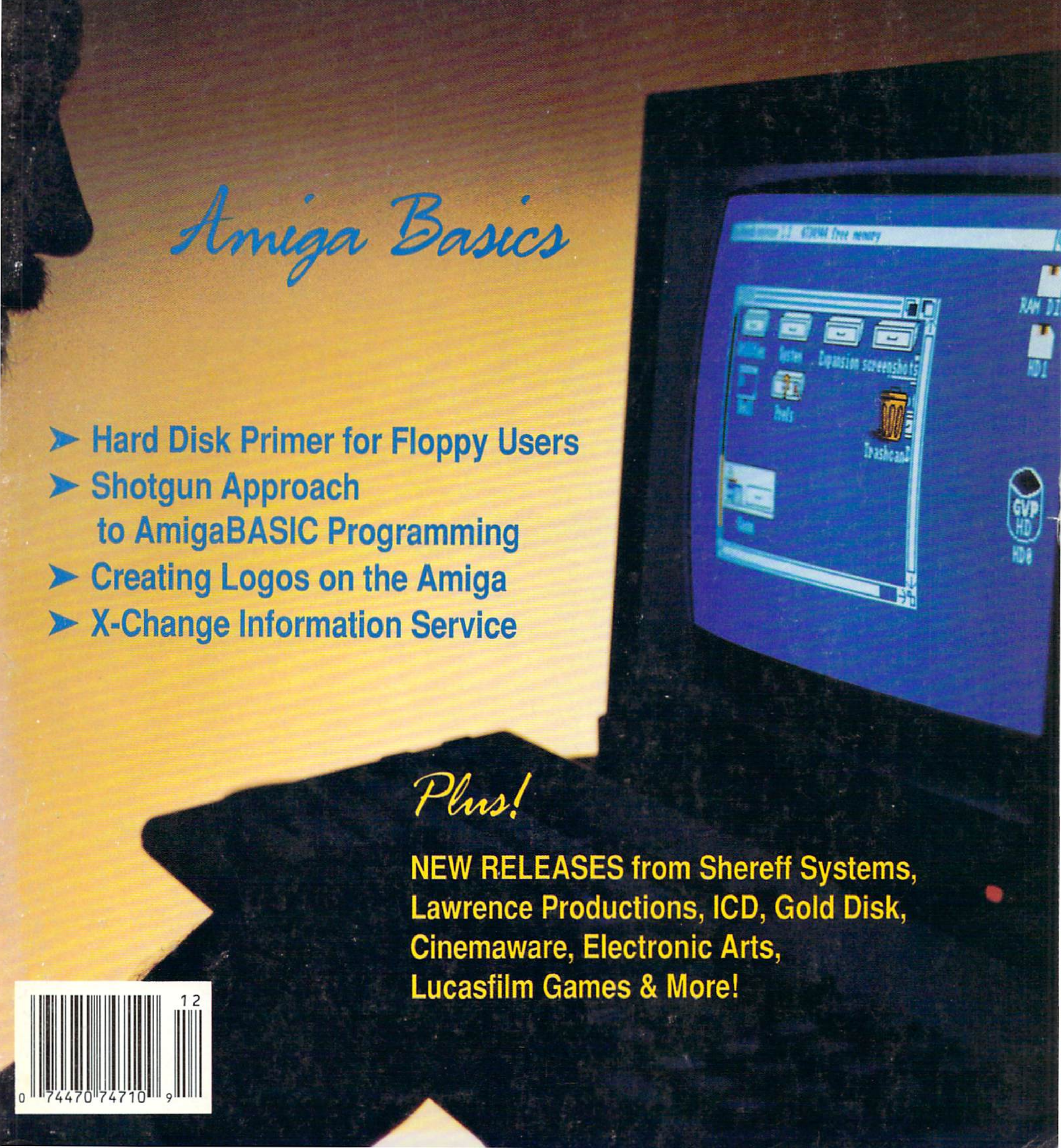
Volume 5 No. 12 December 1990
US $3.95 Canada $4.95



Amiga Basics

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- ➤ Creating Logos on the Amiga
- ➤ X-Change Information Service

Plus!

NEW RELEASES from Shereff Systems, Lawrence Productions, ICD, Gold Disk, Cinemaware, Electronic Arts, Lucasfilm Games & More!

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A Christmas greeting created with Pro Video Post and a digitized IFF screen. See Pro Video Post article on page 10.

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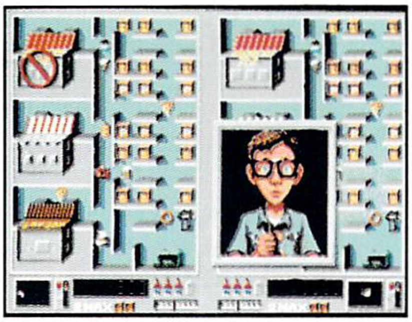

Diet Riot is just one of the five games found in The Future Classics Collection. Your goal is to trash all the evil fast food restaurants while avoiding the loose fast food running wild to fatten you up.

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Cover photo by
Ernest P. Viveiros, Sr.

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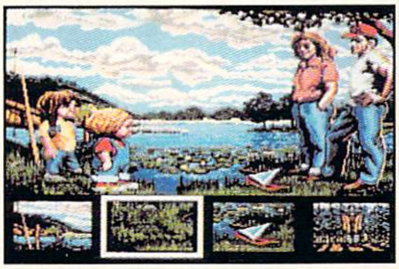
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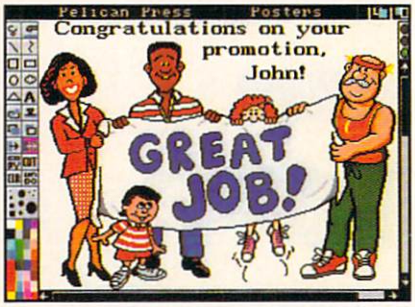

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A detail of the amusing alien poster

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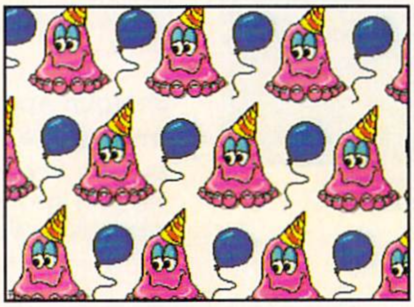

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EDITORIAL CONTENT

There is an old saying, "Give a man a fish and you have fed him for a day. Teach a man to fish and you have fed him for a lifetime." Although this is a great saying, there is one thing missing. It is the same quantity that we cannot place in our magazines. Let me explain.

Amazing Computing has long been in the business of teaching Amiga users how to "fish". The editorial philosophy of this publication has always been to provide a variety of topics and directions of Amiga interest to our readers. Many of you have responded by telling us that we maintain a good editorial "mix".

We then went a bit further by providing *AC's Guide To The Commodore Amiga.* By listing and describing in some detail every available product and service we could find in the Amiga market, we enabled our readers to discover the multitude of different avenues the Amiga has opened for them. The acceptance of this publication continues to be phenomenal. *AC's GUIDE* has grown such that the latest issue (released at the same time as this issue of AC) is now 320 pages long, and weighs almost a pound and a half. It has become the single authoritative source for Amiga dealers, users and developers.

In January, we are launching *AC's TECH For The Commodore Amiga.* Modeled closely after AC itself, *AC's TECH* will concentrate on technical issues and programming. Each issue of *AC's TECH* will come complete with a disk to ease the drudgery of typing in long lists of code. This periodical, which we consider to be the only worthy complement to AC, will allow readers to explore their Amigas to an extent heretofore only dreamed of.

Yet, all of our products require one extra component to be completely effective. It is an intangible—something that no one can print or otherwise place into a publication. Rather, it is something our readers must bring with them to each issue. It is the desire and willingness to learn and use the tools we present in the pages of our "Amazing" family of Amiga publications. It is the determination we implore our readers to use to make their Amigas do what they want to do.

Few of us will ever become experts on every aspect of the Commodore Amiga. Although the applications and tools for the Amiga have grown extremely sophisticated, while the interfaces and tools have become easier to use, only a few of us have either the skill or time to exercise these products to their full potential. And the few who do will need to dedicate a great deal of time and effort into the cause.

Does that mean we cannot enjoy the Amiga without sacrificing friends, family and our jobs? No, it means that we will be able to do a great many exciting things more easily, but, in order to go farther, we must sacrifice some time and energy. It is a fair trade. The more we learn, the more we will be able to do.

And why should we sacrifice our families, our friends, or our jobs when there is a great way to incorporate the Amiga into our lives. The opportunity to use the Amiga as a common tool for the family is too great to ignore. The Amiga is a creative medium as well as an instructive one. There is little stopping the average Amiga user from involving a family member in the Amiga. No matter what their interest, the Amiga is a tool that will help them succeed in it.

So what about the fishing lesson? Well, this is the part of the lesson where we talk about the depth of water you are fishing in, the need to check your lines, the care that should be taken with the equipment, and the expectations any good fisherman has. It is the part of the lesson that requires you to say, "I know it can be done. I know I can do it."

It is never easy, but the one great thing the Amiga has given us, a creative medium, makes our tasks so much more enjoyable. AC's readers are the most involved Amiga users anywhere. We thank you for your support and promise to discover even more ways to expand your knowledge of the Amiga.

Happy Holidays,
From All The Amazing Staff
and Don Hicks

Amazing Computing For The Commodore AMIGA™

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Buddy Terrell & Byrd Press
Bob at Riverside Art, Ltd.
Swansea One Hour Photo
Pride Offset, Warwick, RI
Mach 1 Photo

Amazing Computing For The Commodore Amiga™ (**ISSN 0886-9480**) is published monthly by PiM Publications, Inc., Currant Road, P.O. Box 869, Fall River, MA 02722-0869.

Subscriptions in the U.S., 12 issues for **$24.00**; in Canada & Mexico surface, **$34.00**; foreign surface for **$44.00.**

Second-Class Postage paid at Fall River, MA 02722 and additional mailing offices.

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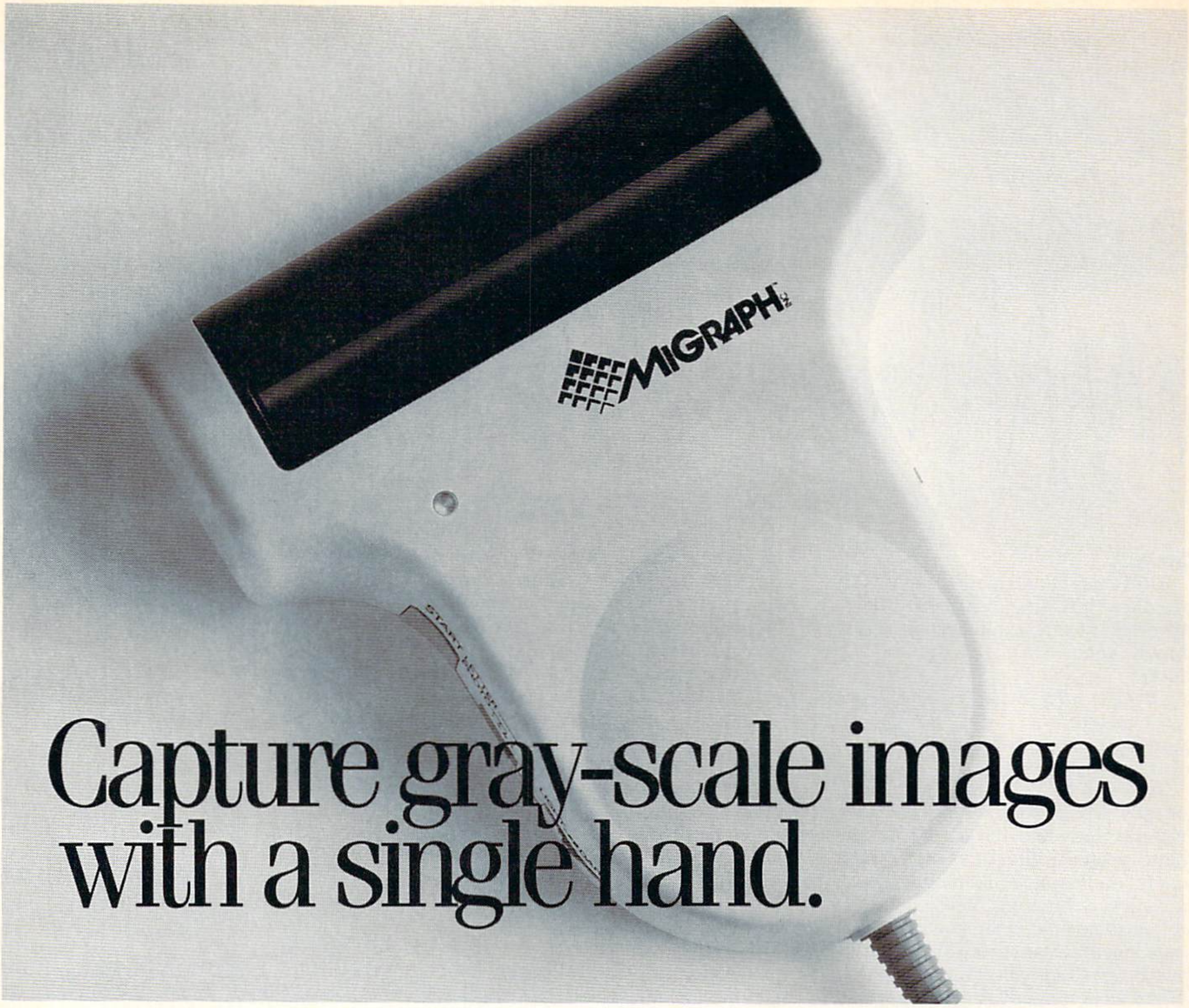

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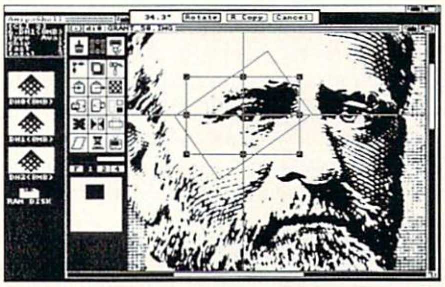

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Feedback

Dear AC:

The Table of Contents of the AC #5.11, November 1990 issue of Amazing Computing for the Commodore Amiga has the following entry:
QUOTE:
"Bug Bytes........70
by John Steiner
... And there is a bogus version of VirusX on People/Link."

This statement is entirely and categorically UNTRUE. There is not now, never has been and never will be any "bogus" version of Steve Tibbett's VirusX program on People/Link. If one goes on to actually read John Steiner's column in that issue, and read what he wrote about VirusX, one will learn that what was actually on People/Link was a warning, posted by Steve Tibbett, about a bogus version of VirusX existing, and that people should not use it nor pass it around. (This is the third time someone has hacked into a copy of VirusX and passed it off as the real thing, much to the consternation of Mr. Tibbett).

Steve is STEVEX on Plink, and he is an Assistant Chairman/Sysop of the Amiga Zone Clubs. New versions of VirusX are always uploaded by Tibbett himself, both to the Zone and to his own BBS in Ottawa. We (the Amiga Zone staff) absolutely never approve for public consumption any VirusX uploaded by anyone else for two reasons:

1. Steve always uploads new versions himself, since he's one of our staff, is VirusX's author, and is on-line constantly and

2. This assures Plink's Amiga-owning membership that they can ALWAYS trust any VirusX they download from the Zone to be the real thing, since the author himself uploads it, and his Plink ID is attached to each of his uploads.

What happened in your Table of Contents in the Nov. 1990 issue is, I can only assume, an unfortunate lapse in editing which led to that untrue statement being printed. I hope your readers actually went on to read what John Steiner wrote in his column, lest they be left with the wrong impression. If they didn't, well then this letter will serve as the correction.

As you know, national commercial computer networks like Plink operate in a highly competitive environment. Things like new versions of widely-used programs must be carefully checked out before being released, and we go to great pains to do this. With Steve Tibbett on our staff, the LAST thing the public needs to worry about is getting a phony version of VirusX from People/Link.

I've been running the Amiga Zone for five years now and take utmost pride in the quality of service we provide to our subscribers. Thank you for giving me the page space to bring this error to your readers' attention.

Best Regards,
Harv Laser
Torrance, CA.
Plink: CBM*HARV
Senior Chairman/Sysop,
American People/Link's Amiga Zone.

—Thank you for the prompt information. We need to know when something has gone wrong immediately in order to provide our readers with the correct information in the next available issue. We apologize for any confusion the misquote in the Table of Contents may have caused.

As always, if anyone finds an error in our work, we need to know. AC is very proud of both the quality and quantity of Amiga information that we have been able to present. Yet, by providing so much material, we must remain twice as vigilant in keeping all the material accurate.—Ed.

WHERE ARE THEY?

In your AC's Guide To The Commodore Amiga I was just reading about a printer driver for the HP Deskjet called Super DJ Desk Jet Printer. Unfortunately there's only the name of the company mentioned: Creative Focus. I couldn't find its address in your guide and so I would like to ask you to give me the address.

Sincerely yours,
Theo Nötzli
Switzerland

—You can contact Creative Focus via the following address and phone number:

P.O. Box 580
Chenango Bridge, NY 13745-0580
(607) 648-4082

IN ANOTHER EPISODE OF WHERE ARE THEY?

On page 62 of the August issue (V5.8) The Bandito mentions a PostScript printer driver (Postdriver) released by Soft Service of Finland. Would you please tell me who publishes this package in the United States, or how I can get in touch with either Soft Service or a European publisher who handles this software product? Thank you for your attention.

Sincerely,
George Davison
Palos Verdes Estates, CA

—We don't know of any United States distribution, but anyone can contact Soft Service through the following address :

Soft Service, Inc.
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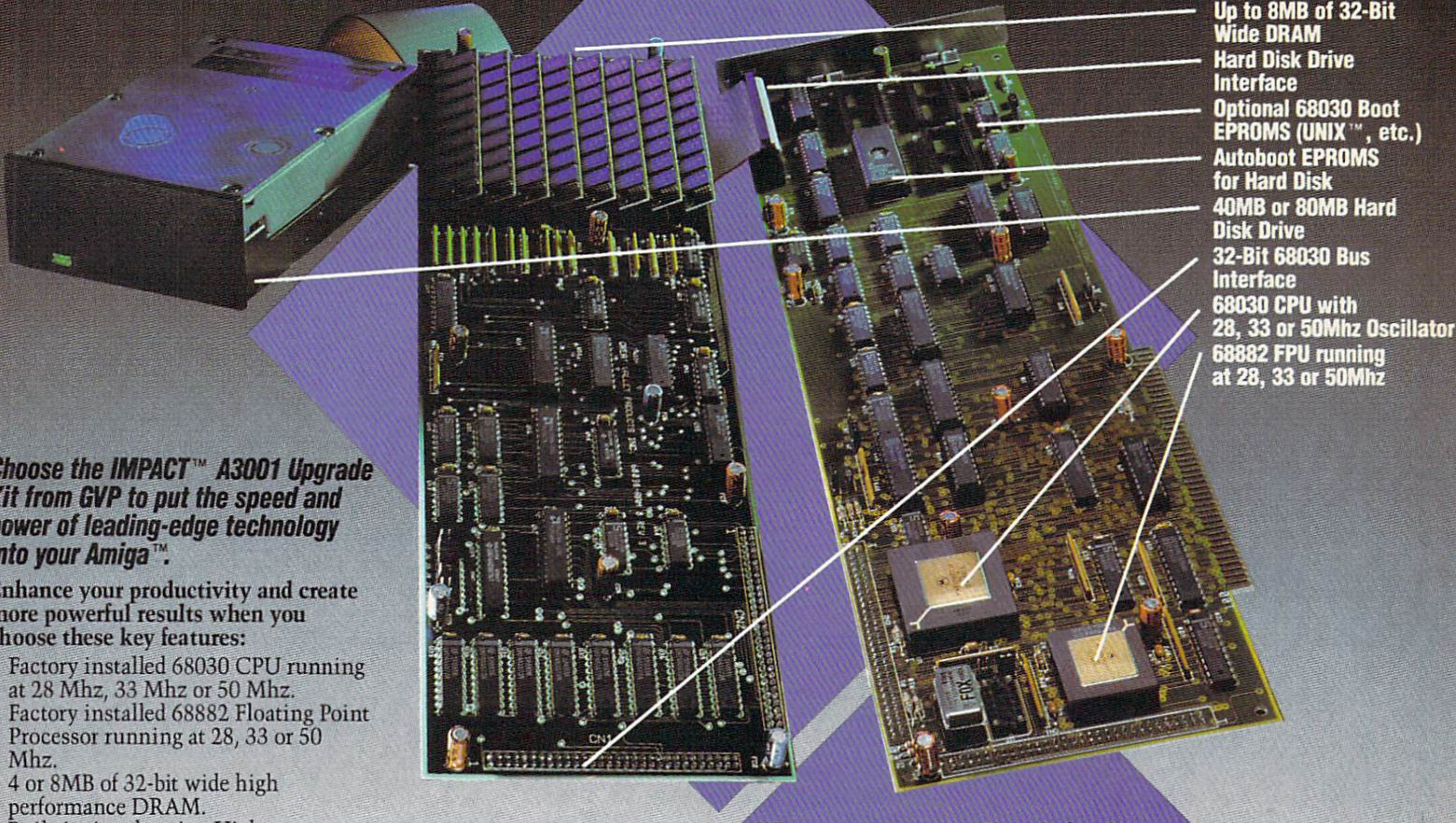

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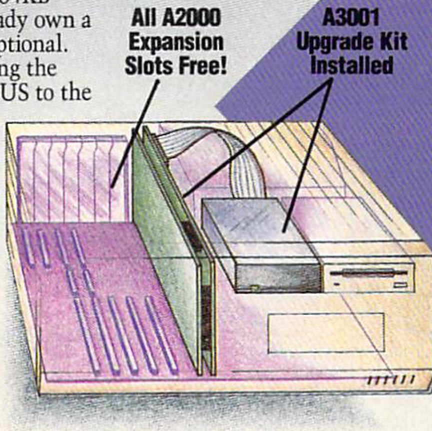

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A FIX FOR MODULA-2

I was rather disappointed in the article in the October '90 (V5.10) issue about adding Assembly language to Modula-2 and BASIC. It suggests a very poor and unnecessarily complicated way of adding Assembly to Modula-2. All that's really needed is something like this:

```
PROCEDURE name;
BEGIN
     CODE(xxxxH, xxxxH,…);
      .
      .
      .
END name;

  or, with parameters:

PROCEDURE name(dr0, dr1:LONGCARD; ar0:ADDRESS):
LONGCARD;
BEGIN
     SETREG(0,dr0); SETREG(1,dr1);
     SETREG(8,ar0);
     CODE(xxxxH, xxxxH,…);
      .
      .
      .
     RETURN REGISTER(0);
END name;
```

I use the M2Sprint compiler but it should be exactly the same for most any Modula-2 compiler.

It's also a simple matter to write an ARexx program to convert a A68k Assembly listing to the 'CODE()' statements required by Modula-2.

Another important consideration, to keep in mind, is to preserve the A4 register which is used to point to global data in Modula-2 and 'C'. If you do alter the A4 register in your assembly program you will need to add these statements to the beginning and end:

```
move.l a4,-(a7)
        .
        .
        .
move.l (a7)+,a4
```

I have been a certified electronic technician and programmer for about twelve years and regularly use Assembly in Modula-2 to control custom hardware I design for my A2000.

Thank you,
Michael Walters
Tustin, CA

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VALUE ADDED RESELLER

Your October issue was full of good news. It looks like Commodore is finally getting their act in gear! The Commodore Value Added Reseller (VAR) program is a great idea, and, apparently, it is off to a great start. Licensing CDTV technology offers additional possibilities, as The Bandito reported in October. The home computer market is looking good, too, as Amigas fill the shelves of high-end retailers. Finally, targeting the Amiga at business sectors will help our favorite machine establish professional credibility —something that is long overdue, considering the Amiga's superiority over its competitors in several areas.

One thing, however, is worrisome. Why are Apple, IBM, and other computer-maker commercials and advertisements so prevalent, while the Amiga is scarcely heard from? I hope Commodore has something up its sleeve come Christmas. It is time to turn up the heat on mediocre Tandy's, over-priced Apples, and staid IBM-compatibles!

Cordially,
Joe Vidueira
Miami, FL

All letters are subject to editing. Questions or comments should be sent to:

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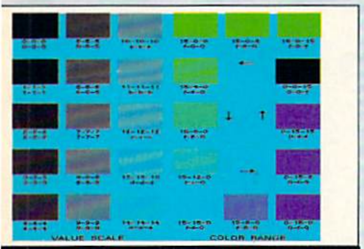

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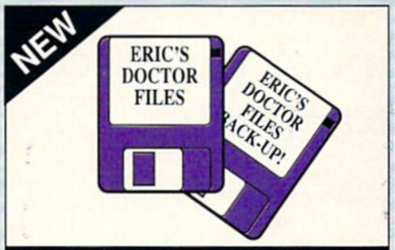

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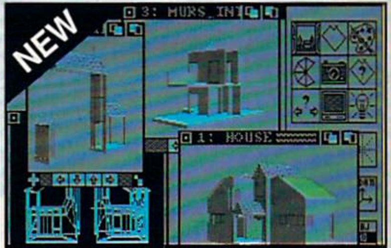

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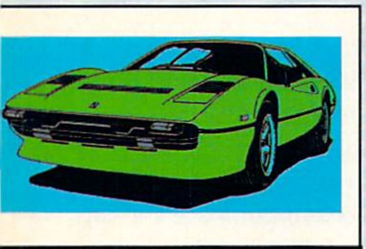

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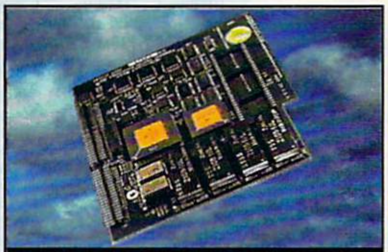

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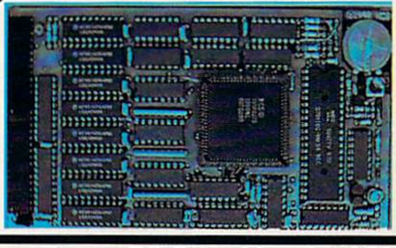

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Pro Video Post

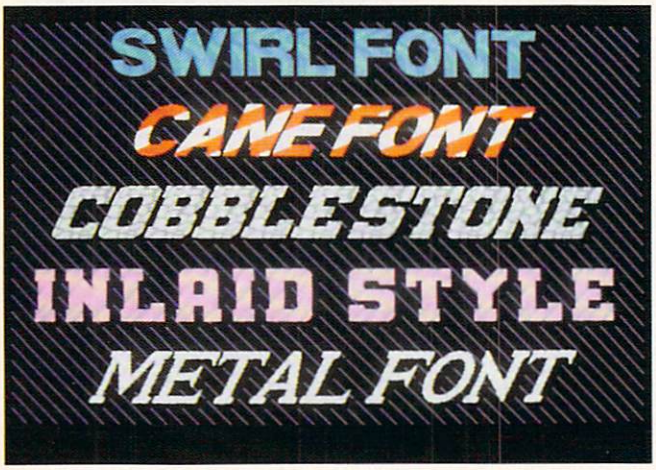
Produces dazzling "post-production" digital video effects

by Frank McMahon

DEDICATED CHARACTER GENERATORS are pretty much standard at most television and cable stations these days. It's hard to imagine running one without some machine to render text over broadcast images. Two problems with most character generators, is that once you buy them, unlike software, they cannot be upgraded with new features or improvements and they are often very expensive. Pro Video by Shereff Systems is a character generator program that has gone through many updates through the years (Pro Video Plus, Pro Video Gold) and the latest version is entitled Pro Video Post. The "Post" meaning "post-production", a video term for altering and manipulating your work after you have created it. This program produces some dazzling "post-production" digital video effects (DVE), but we'll get to those in a little bit. For right now let's just start off with the basics.

TEXT MANIPULATION

It should first be noted that Pro Video Post only operates in the hi-res mode (720x480) and it does not multi-task. These are both smart moves rather than program limitations. It is easily moved to a hard drive and the only copy protection is a requestor asking to type in the 4 digit serial number. The program requires that your Amiga have one megabyte of chip memory and 2 megabytes of fast memory. 90% of all functions are accessed through the function keys. In fact a laminated template is included which fits neatly on the Amiga keyboard (over the function keys), it comes in very handy. Hitting F1 brings up the line size requestor. There are a choice of 4 line sizes: 32, 48, 64, or 80. Those numbers represent the amount of vertical hi-res lines. One nice feature is that for most operations you can hit the "p" key to assign attributes to the entire page, rather than doing it on a line-by-line basis. After setting up the size of the lines, the next step is to choose which font is to be used. One drawback to this program is that it only supports it's own system fonts, four of which are included with the program.



Just some of the various font styles and textures that come supplied with Pro Video Post.

Additional font sets are available, 4 fonts for $99.95. The price is kind of high, however these are just not any fonts. All of them have been designed to be resized and manipulated as well as look great on video or during multimedia presentations. The fonts even have built in anti-aliasing. But it's debatable if all 16 fonts available are worth $400.

Choosing fonts is easy, by using the cursor keys (which are used for almost all of the program selections) you can choose the type and color of the font. The four included are pretty basic and work great for most purposes. Colorfonts are not supported but multi-color textures are available. Some of the choices (7 in all) are swirl, cobblestone, and metal. These textures lack the 3-D feel of some Colorfonts (like the KaraFont collection) because rather than being built from the ground up, they are only filling in a texture of an existing font. They are also limited to 2 and 4 colors, rather than the usual 8 colors associated with Colorfonts. However, the included textures certainly add a lot of life to the existing fonts and I've transferred several to 3/4 inch video tape with anti-aliasing and they look fantastic.

You can simply begin typing after choosing the font you want to use. A welcome feature is that you are allowed different size and style fonts on the same text line. An Italic font is available on a line or global basis. Kerning is also available (a method usually seen in high end systems which automatically adjusts spacing between letters and gives a clean symmetrical look to all text). Smaller fonts can also be moved to 5 different points on the line which allows creation of effects like superscript and subscript. The underline feature can be turned on or off with the ability of being able to assign it a different color other than the text and you can move the line into anyone of six positions from the top of the line to the bottom. Other options are included for adding shadows and edges to the text. The shadows are adjustable (8 preset locations) and can be filled to create a 3-D feel or casted to form a standard shadow. The shadow size and edge size can be easily adjusted. And an edge can be formed around just the text itself or around the text with the shadow. Both shadows and edges can be any of the sixteen colors but it usually works best to set the shadow color to half the intensity of the current background color via the palette options menu.

Standards such as clear line or page and justify line or page are included as well. Lines can be moved up or down or to and from memory. Lines can also be filled with 2 strips of background color and positioned and sized as needed. In addition to text, a set of graphic characters are also available (similar to some of the old Commodore 64/128 characters) which let you create limited designs. The set also includes various copyright and trademark characters. These essential additions are almost always overlooked by other Amiga character generator programs.

GRAPHIC SCREEN CREATION

All the text manipulation features and extras would be enough to carry a program, but with Pro Video Post it is just merely the tip of the iceberg. In addition to the text, graphics can be added to create impressive backgrounds quickly and easily. The Grid Attributes menu allows quick creation of various patterns such as horizontal lines, vertical lines, squares, diagonal left lines, and diagonal right lines. The lines can be positioned, resized, and colored to hundreds of variables. And by using a text line the Quick Background menu also allows you to create backgrounds. Options such as position, justify, center, tile, copy, and wallpaper are included.

What Pro Video Post lacks in palette options, it more than makes up for with extensive color cycle control. There are four independent channels of color cycle and color flashing per page. Colors can be set to cycle by high colors or low colors. And there is even an option to adjust the cycle/flash by video fields. However, the program only supports the Electronic Arts Deluxe Paint color cycle format and does not allow reverse cycling.

The best thing about creating backgrounds is that any hi-res IFF picture can be loaded and used. Other resolutions can be loaded in provided that they are not more than 4 bit planes (16 colors). HAM pictures obviously won't work but can be converted easily with a program such as ASDG's Art Department. Pictures can be loaded into memory and grabbed for use via the "Get" command. One new feature of this latest version is the "Manipulation" menu. "Size" lets you resize your picture (enlarge or reduce) to a variety of sizes. You can then easily move your newly converted pic to any position around the screen with the cursor keys. "Angle" let's you tilt, slant, or rotate the current screen. This is similar to the perspective feature found in Deluxe Paint III but it is a lot easier to use. With "Move" you can reposition the entire screen. "Wall" lets you create a wallpaper of the current screen with vertical and horizontal repeats. "Mirror" is for creating reflections of the other side of the page. "Color" allows remapping and "freeing-up" of your current palette. With any of the "manipulation" commands you can easily hit "reset" and go back to what you started with. The original image is saved in ram so you can't accidentally alter it beyond repair (unless you want to!). Your original image always stays intact. All of these "manipulation" features are powerful and work fast. Combining three or four effects with different graphic screens creates some stunning new designs. You can even paste two images together automatically (each picture occupies every other scan line) for more dazzling effects.

CREATING PRESENTATIONS

The power of any character generator is not only judged by how well it creates pages but how it displays them. Pro Video Post excels at creating smooth presentations as well as different transitional effects. Pages are saved in "Banks" of 100, numbered 00 through 99. They are saved in files called "Jobs" which is a bank of 100 pages. The high compression routine stores the files as ascii text and data rather than by regular hi-res screens. This allows 100 pages to use less memory than displaying one hi-res screen! It's easy to access any page and there is also a command for automatic duplication of pages. Where Pro Video Post really shines is it's wealth of transitional effects. Close to one hundred effects are included, everything from slide to reveal to bang to random squares to push. Some affect the whole screen while others work on a line by line basis. This means you can select different transitions for different lines!

Thanks to the 1 meg chip RAM, transitions are smooth and images are flawlessly pushed or pulled off screen as a new one comes on. Earlier versions of the program had to clear the screen before a new one appeared. The transition speed as well as the amount of time each page is displayed can be set. While 99% of Pro Video Post is keyboard controlled, the mouse can be used to advance (or move back) through the pages. Which makes it handy for presentations. Automatic controlled presentations are perfect for cable station on-air character generators which rotate 24 hours a day.

EVEN MORE FEATURES

Pro Video Post packs in even more features than those listed above. "Snap" will take a snapshot of the current screen and store it in memory for later use. Pro Video Post is always checking the systems memory and provides ample warning

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status lines if there is not enough memory to perform a certain task. The system is extremely stable since I've yet to crash it with the extensive use given it over the past few weeks. Horizontal and vertical page positioning is also available for adjusting, centering, and genlocking over live video.

Speaking of genlocks, Digital Creations' SuperGen, SuperGen 2000S, and Magni's 4004 genlock are all supported and keyboard commands offer "limited" control. While the manual says "limited", the included commands for key, reverse key, fade, and fade speed (by field) sound pretty complete to me.

Cue tones let you know when the program is ready, when you have canceled, or when it is warning you. GPI trigger support is though game port 2, which allows control of an edit controller. Crawl and Roll, all too often left out of some Amiga character generators programs are available. Roll produces super smooth credits for endings of shows or presentations and crawl will crawl a text message across the top or the bottom of the screen. An extensive tutorial section gently guides you through most aspects of the program and is an excellent way to get started quickly. Sections are also devoted to picture palette management and reducing system memory needed for graphic screens.

DIGITAL VIDEO EFFECTS

Pro Video Post is capable of producing DVEs on any screen quickly and easily. 12 basic DVEs are included with various alterations to create a total of 82 effects. The manual does a nice job of illustrating what each effect will look like. To create a spin, zoom, flip, or any of the other effects, all you need to do is simply choose the DVE number. A requester appears allowing you to input the amount of fields (frames/seconds) the animation will last. Since the DVEs are already predetermined, calculation is as expected surprisingly quick. I've tried most on a stock 2000 and it usually takes from 30 seconds to 1 minute to render each. When I tested it on a 2500, the renderings blazed in at around 10-15 seconds with some almost instantaneous. Now I've tried page manipulations with everything from DeluxePaint III to AnimMagic, and these are without a doubt the smoothest moving, quickest rendering, and most professional I've seen. Hitting the return button brings the DVEs animation in and hitting it again brings it back out. You can try different combinations instantly without repeatedly loading the picture in again or having to dump the animation out to free up RAM...it's all automatic. Some packages claim to have DVEs , but these really look like Digital Video Effects!

SUGGESTIONS

I wish there was an easy way to resize a line of text without having a requestor force you to erase it. These fonts should be capable of resizing when a line is resized. The color selection could also use some improvement, using RGB numbers with the arrow keys is tedious. Overall performance is a tad sluggish on a 68000. Although it's unclear if the program takes direct advantage of a 68030, it clips along great on a 2500. The manual is set up very clearly except that it has no real index. This omission is a surprise considering the attention to detail the rest of the manual sections contain. The (ESC) key is supposed to stop crawls and rolls but sometimes you must wait for the entire text message to go by before it activates.

CONCLUSIONS

Except for these minor and very correctable problems, the latest version of Pro Video is a first class character generator. It combines loads of features as well as being fun and easy to use. It also provides truly professional output. Also worth mentioning again are the DVEs. In addition to the smooth and varied page transitions, steady crawls and rolls, fast page manipulation and special effects, and sharp anti-aliased multi-colored fonts, the DVEs animation is the icing on the cake. They make any graphic/text screen leap out of the screen and grab the viewer. This is one program that will get a lot of use in our cable television studio. This program has come a long way in the past few years, being constantly worked on and improved dramatically. I wonder what Shereff Systems has in store for us next?

•AC•

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NEW PRODUCTS & other neat stuff

Gold Disk Office

Gold Disk Inc. has released **Gold Disk Office**, an impresive package of five fully integrated programs that turn an Amiga into the center of operations of a highly productive office.

Word process multiple text documents of any size in Office Write, which offers high-performance features requisite of any fast-paced data input facility, like fast text editing, automatic hyphenation, spell checking, index creation, mail merge, keyboard macro functions and on-screen page preview.

To get high-quality typeset page layouts for newsletters, flyers and the like, move your text documents into the desktop publishing program Office Page. There is another full-featured text editor built in here, too, so you can create documents in layout without having to import text from somewhere else. Set and manipulate text in different fonts, sizes, styles and spacing alignments; integrate graphics, boxes and line drawings for truly professional-looking and visually stimulating pages.

Office Calc lets you design and construct customized spreadsheets for business and home accounting and financial management applications. A number of professionally-prepared spreadsheet templates are also supplied with the program for your immediate modification and use; they also serve as good studies as you learn how to build your own templates from scratch.

Besides having built-in math, time, index, trigonometric, statistical and financial functions of spreadsheet programs costing far more, Calc also provides a macro facility plus an Arexx interface and special command language—all of which extend the program's capabilities by allowing you to build and access complex operations not directly available in Gold Disk Office.

Office File is a database program—here you create, modify, store, manage and print mailing and telephone lists, inventories and similar collections of indexed data. Office File sorts and orders these lists by any individual bit of information (field) you define—first name, last name, zip code, area code, etc. The program's flat-file format allows you to display the entries (records) in a database on screen and scroll through them both vertically (to see the next record) and horizontally (to view fields within a record that extend off the screen to the right).

Records are displayed on screen and are also stored on disk at all times; each time you modify the database the new information is recorded in the database file stored on disk. Disk storage permits the use of very large databases and prevents loss of entire databases in the event of power or other system failure.

Office Graph lets you turn spreadsheet and any other data (including that imported from other formats) into a wide variety of charts and graphs, which can themselves be imported into and incorporated within Office Page layouts.

Gold Disk Office can run on any Amiga—even an Amiga with just 512K of memory. With less than one megabyte available, the user must accept certain limitations, but the manual states that Office Page remains fully capable of turning out professional desktop publishing work with just the 512K. The manual explains exactly what restrictions are imposed on a user running Gold Disk Office on a 512K with just the 512K. The manual explains exactly what restrictions are imposed on a user running Gold Disk Office on a 512K system, and provides a number of helpful memory-saving tips.

The package consists of four non-copy protected disks plus the 347-page manual. *Gold Disk Office, price: $295.00, Gold Disk Inc., 5155 Spectrum Way Unit 5, Mississauga, Ontario, Canada L4W5A1, (416) 602-4000. Inquiry #224.*

Music-X Jr.

Microillusions has trimmed some of the "complicated extras" from its professionally oriented Music-X MIDI sequencer package to come up with **Music-X Jr.**

Music X Jr. has all the power and many of the features of the original Music-X package (the two are fully compatible), only now, anyone can create and edit MIDI sequences.

Jr. provides 250 empty sequences for recording in the program's primary page, Sequencer. Play as many as 20 sequences simultaneously, and save entire performances or just portions of them to create templates, drum solos, standard keymaps and more.

The Bar Editor displays music graphically, permitting intuitive composition editing via common functions such as add, cut or copy and paste, cut, and insert. This page is used to correct existing sequences, as well as to create new ones.

The Keyboard Mapping Module puts real-time control of all MIDI hardware and software at your fingertips. It lets you quickly change the configuration of your synthesizer keyboard with up to 128 splits, one for each possible MIDI note.

Music-X Jr.: MIDI sequencer for the masses.

Gold Disk Office means business.

Process incoming MIDI data in the Filters Page before it goes on to the Sequencer; load as many as 16 IFF or Sonix music samples in the Amiga Samples Page for internal voices playback. Music-X Jr. can use the Amiga's internal voices without MIDI.

System expandability is facilitated in that third-party software modules can be called directly from Jr.'s menus; file conversion utilities are included.

A minimum 512K RAM (and an audio monitor) is required to run (and hear!) Jr. using only the Amiga's internal voices, but 1MB is recommended.

In addition to the non-copy protected program disk, Microillusions includes an Examples disk to get the program up and running immediately, and a highly detailed 200+-page manual. *Music-X Jr., price: $149.95. Microillusions, P.O. Box 3475, Granada Hills, CA 91394, (818) 785-7345, Inquiry #225.*

Ducktales: The Quest For The Gold

Walt Disney Computer Software has released **Ducktales: The Quest For The Gold**, an action-packed contest/adventure based on the popular children's animated TV series and feature film that stars Alan Young (a/k/a "Mr. Ed's" Wilbur Post) among its lead voices.

The contest begins when Scrooge McDuck is challenged by Flintheart Glomgold to see who can collect the most money in thirty days to become Dime Magazine's Duck of the Year. Thus begins a treasure-seeking jaunt that takes players around the world in a highly interactive adventure.

Play begins in Scrooge's office, where contestants vie to earn a fortune in the stock market, compete for a chance to search Scrooge's Money Bin in hopes of discovering rare coins, and work to enter the Control Center to travel to exotic locations on faraway continents looking for more riches.

Ducktales is separated into six different games played at three ability levels. A clever protection against copying has been designed to also fascinate younger players: a map of Scrooge's worldwide operations can only be deciphered using a Secret Code Sheet.

An electronic atlas built into the same map provides background information on humorously twisted destinations like Duckburg Island, Okeefadokie Swamp, and Whatsamatterhorn, and also tells players how long it it takes to get to each—and what treasures they will find there.

Players get to perform wild, acrobatic airplane stunts, do their best to sidestep coconut-wielding monkeys, and encounter other similar thrills during the course of this entirely non-violent globe trot. *Ducktales: The Quest For The Gold, price $44.95. Walt Disney Computer Software, Inc., 500 S. Buena Vista Street, Burbank, CA 95121, (818) 567-5360. Inquiry #226.*

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Barney Bear Meets Santa Claus

Free Spirit Software has published another title in the early education Barney Bear game series.

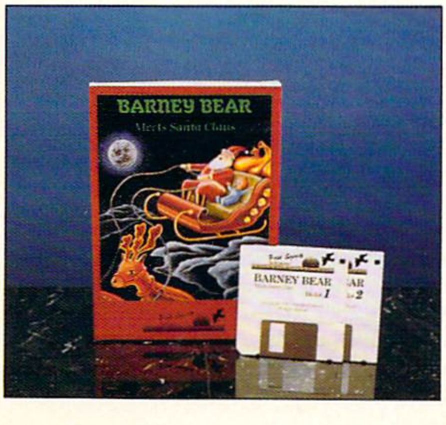
Just in time for the holidays, **Barney Bear Meets Santa Claus.** Travel with Barney to the North Pole on Christmas Eve to visit Santa's Toy Factory, which is chock full of active items like elves buttons, switches, a clock, a toy chute—and more.

Throughout the story there are many active items in each picture, so tell the little ones not to rush! Each time they select an item, the game makes a sound or tells them something about the object. Santa's beard, eyes, and belly are also active.

In addition to a great sleigh ride and visit to the Toy Factory, Barney Bear can participate in six other activities, each of which can be entered into by selecting objects in the Toy Factory. They are: Find the Elf Game, in which children must find the elf by choosing the package the computer asks for; Which One is Different Game, in which they must click on the one of the four pictures that is different; Missing Letter Game, which tests kids on their ability to choose the correct missing letter in a dispalyed sequence of letters; Mixed Up Words Game, in which all the letters of a word are jumbled along the bottom of the screen and jump into place on a line above when chosen in their correct order; The Toy Maker, which lets players join Santa's elves in the stimulating, creative art of toy-making (different heads, arms, legs, etc. are provided); and Coloring Book, in which the package's painting program draws a picture with no color and players get to fill it in with various colors.

Ten buttons below the picture can be clicked on, and each has a different function. The Right Arrow moves forward to the next picture, Left Arrow takes kids back to the previous picture, Color Squares cycles the colors in the picture, Square erases the current picture, Squiggly Line turns on freehand drawing, Straight Line turns on line drawing, Box turns on box drawing, Circle turns on circle drawing, White Circle turns on the eraser, and Stop Sign quits the painting program and goes back to the living room.

Barney Bear Meets Santa Claus is the fourth in a series of learning games built around entertaining storylines that are loaded with fun and surprises; even very young children can play for hours without adult supervision. Barney Bear runs on Amigas with 1MB of RAM or more. *Barney Bear Meets Santa Claus, price: $34.95. Free Spirit Software, P.O. Box 128, 58 Noble Street, Kutztown, PA 19530, (215) 683-5609. Inquiry #227.* •AC•



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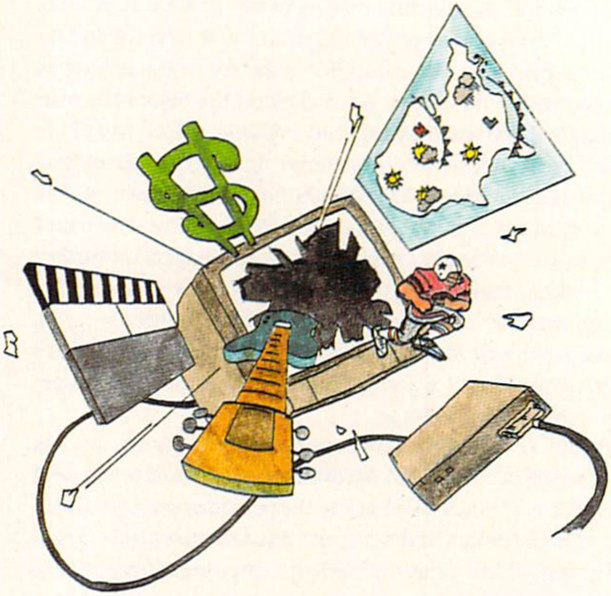
Information X-Change

by Rick Broida

X-CHANGE HAS TO BE ONE OF THE best-kept secrets in the personal computer industry. Although it's been around since 1985, no one seems to know it exists. Perhaps that's understandable, since X-Change is not exactly messianic for all users. In fact, determining how X- Change may best be put to productive use is something of a challenge.

Born of the Colorado-based company X-Press, X-Change has helped realize a once-futuristic vision of computer services: information at your fingertips. Through a combination of hardware and software, X-Change provides 24-hour news, sports, weather, stock market reports, and other information. What's unique about the approach is that X-Change does not transmit data through phone lines; it uses cable.



THROW ME A LINE

Yes, it uses the same "cable" that brings HBO and MTV into your home. The basic X-Change package costs $99.95, and includes the InfoCipher Receiver (which is a textbook-sized box that plugs into your serial port), a special serial cable, and the X-Change software.

One "hitch" is that you do need to be a cable subscriber to use this service. There are no additional payments beyond the cost of your regional provider's basic cable television package, but if you're not already paying for cable, it begets that monthly fee.

Current cable subscribers might pursue the option of buying a cable splitter and some coaxial cable (available at any Radio Shack) to run from the wall jack to the InfoCipher. Doing so should cost no more than $10–20, which is money well spent when you consider you're doubling the use you get from your cable service. If it's impractical to go that route, ask your cable company to install an extra jack near your computer. This will add an extra three to five dollars to your monthly cable bill.

Installation is simple since none of the hardware involves going inside your computer. Just plug in the serial cable, plug in the Receiver, install the software, and you're ready to fly.

AROUND THE WORLD IN A BLIP

X-Press transmits data from more than twenty different information sources, including Associated Press, Copley, Knight-Ridder, and Moscow's TASS. This data is electronically broken down into different categories, including Headline News, Business & Finance, Soviet Union, and many more. And those are just the subheadings that fall under the News category. Other main areas include Sports, Weather, Lifestyles, Entertainment, and Tech Talk, all of which have numerous subcategories within. Lifestyles, for instance, is broken down into Food, Fitness & Fun, Moneywise, and Careers, to name a few. The variety of available information is wonderfully vast, and it's all right at your fingertips. Let's not forget the stock reports either. More than 2,000 stock quotes (preselected by X-Press) are supplied through X-Change.

The X-Change software is available in numerous formats, not the least of which is for the Amiga. Having used the IBM software quite extensively, it is important to note that the Amiga version is not simply a direct port; it was written specifically for the Amiga, in order to take advantage of the Amiga's abilities.

It is the software that's in charge of sorting through all the material and making it readily accessible. The program is not difficult to use, relying on simple menus to access the stories and articles as they come in. Very simply, when a certain type of story has been transmitted, a plus sign will appear next to the category name. Using the software is part of what makes X-Change such a pleasure; after doing the initial setup, you can easily run the program without the instruction manual. If you need detailed help, however, information is quickly found in the brief guide.

PICK AND CHOOSE YOUR NEWS

All of the data transmitted from X-Press goes through the X-Change system, but not all of it is necessarily kept. You may configure the software so that it retains only certain types of stories. If you're not interested in, say, news from Germany or anything sports-related, you may deselect those categories and X-Change will not retain them. All other stories are buffered in the computer's RAM.

Theoretically, the more memory you have, the more stories you should be able to retain. The Amiga version doesn't seem to work that way, however. On a one-megabyte Amiga the software wouldn't cross the 512K line; the program's buffer filled up with more than 500K of system memory left.

The rate at which data is received is surprisingly quick: 9,600 bits-per-second (bps). Considering that 9,600 bps modems still cost upwards of $500, this is an impressive speed, and it's also a testament to the use of cable for data transfer. A future feasibility is to have such information become available directly on a TV screen, without needing a computer conduit.

UNIVERSAL HANDSHAKE

Because X-Change is an external device requiring only a standard RS-232 (serial) port, its usability is limited only by the availability of the software for a computer system. According to an X-Press representative, the software is available for "practically all computers."

Customer support is another noteworthy feature of the X-Press company. Two 800 numbers operate 9 a.m. to 9 p.m., Monday through Friday, to handle orders, answer any questions about the service and offer technical support.

Yet another impressive feature is X-Change's ability to capture software downloads. At three or four in the morning during certain days of the week, X-Press transmits a few shareware/public domain software programs, again free of charge. You need to simply run the included capture program and leave the computer on through the night, and in the morning you'll have a checkbook balancer, coin collection manager, game, or the like. I tried the program once, and in the morning found it had run without a hitch.

If you don't mind paying monthly fees, other X-Press services are available. At a base price of $149.95 and $19.95 per month, you can buy X-Change Executive. This business-oriented upgrade provides a full 30,000 stock quotes, which are updated every fifteen minutes instead of thrice a day, plus additional business and financial news.

Finally, the question of your cable company arises. If it does not offer the X-Change service, you're out of luck unless you own a satellite dish. If so, an add-on is available to allow you to run X-Change. To determine whether or not your cable company supports X-Press (according to the representative, most do), X-Press' 800 number, give the operator your zip code and you will receive an immediate answer.

THUMBS UP

All in all, X-Change is a superb product. It is quick, varied, well-supported, and inexpensive if you already subscribe to cable. Nevertheless, as previously mentioned, finding an ideal use for X-Change in the home is not easy. It can certainly keep a stock portfolio, and continually bring world events straight to your computer, among many other tasks.

Perhaps its most practical place is in schools, where teachers can use the output for studying current events. In addition, because the software is so easy to use, students who are computer-new have in X-Change a good opportunity for their first hands-on experience.

If you can't come up with a totally justifiable use for X-Change, but are into the "just plain neat", X-Change is a five-star product and well worth the investment. •AC•

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Stepper Motors

by John Iovine

THIS IS PART ONE OF A THREE-PART SERIES. NEXT MONTH, WE WILL build an ultrasonic ranging device for the Amiga. Then, the following month, we'll tie the two projects together and create a rudimentary sonar system.

The interfacing project for this month involves hooking up a stepper motor to the Amiga. Stepper motors are commonly used in robotics, automation and positioning control in commercial and industrial equipment. These motors are as close to you as your disk drive and printer.

Stepper motors are used in these applications because they are easily controlled by digital circuits, and most important, capable of precise positioning. We will build a simple stepper motor interface for the Amiga and also examine the basic operating principals of stepper motors.

Stepper motors are different from "normal" electric motors. When you apply power to an ordinary motor, the rotor turns smoothly. A stepper motor, however, runs on a sequence of electric pulses to the windings (or phases) of the motor. Each pulse to the winding turns the rotor a precise amount. These pulses to the motor are often called steps. Stepper motors are manufactured with different amounts of rotation per step (or pulse), depending upon the application each is designed and built for. The specifications of the stepper motor will state the degree of rotation per step. The range of rotation per step can vary from a fraction of a degree (i.e., .72 degree) to many degrees (i.e., 22.5 degrees).

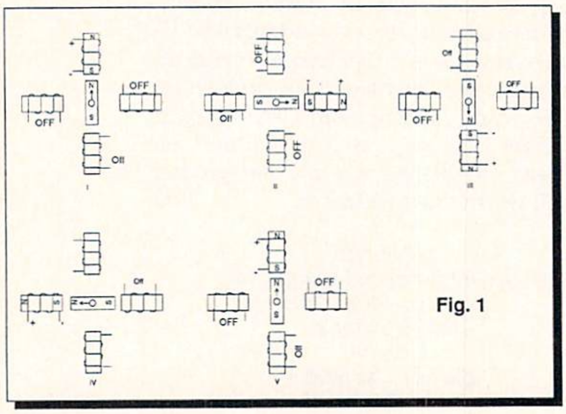


Fig. 1

BASIC OPERATIONS

Figure 1 is of a stepper motor stepping through one rotation. Stepper motors are constructed of strong permanent magnets and electromagnets. The permanent magnets are located on the rotating shaft, called the rotor. The electromagnets, or windings, are located on the stationary portion of the motor, called the stator. The stator, or stationary portion of the motor, surrounds the rotor.

In Figure 1, position I, we start with the rotor facing the upper electromagnet that is on. Moving in a CW (clockwise) rotation, the upper electromagnet is switched off, as the electromagnet on the right is switched on. This moves the rotor 90 degrees in a CW rotation, shown in position II. Continuing in the same manner, the rotor is stepped through a full rotation, till we end up in the same position as we started in (shown in position V).

RESOLUTION

The degree of rotation per pulse determines the resolution of the stepper motor. In the illustrated example, the rotor turned 90 degrees per pulse: not very practical. A real-world stepper motor—one that steps 1 degree per pulse, for instance—would require 360 pulses to achieve one revolution. Another motor with less resolution (greater degree per step) that steps, say 3.75 degrees per pulse, would only require 96 pulses for one full rotation.

Without getting into gearing or gear ratios, let's assume that the stepper motor is used for positioning in a linear motion table, and further, that each revolution of the motor is equal to one inch of linear travel on the table. It becomes apparent that each step of the motor defines a precise increment of movement.

In making a comparison between the two stepper motors, that with the higher resolution (one that requires the most steps per revolution) has the ability to locate and position more precisely on the table. For the motor that steps 3.75 degrees per step, the increment of movement is approximately .01 inch per step. If

Please Note: *This project may void your warranty and is offered for the enjoyment of the technically inclined. P.i.M. Publications, Inc. is not responsible for any damages incurred while attempting this hardware project.*

this resolution is sufficient for your table, use this stepper motor. If you require greater resolution, the 1-degree-per-step motor will give approximately .0027 inch per step. So, the increment of movement is in proportion to the degrees per step.

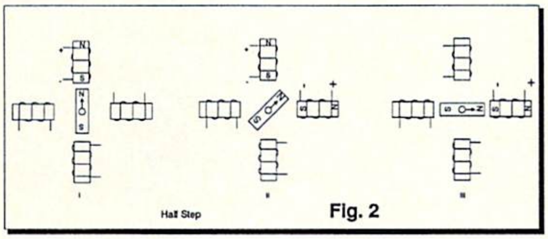


Fig. 2

HALF STEP

It is possible to double the resolution of some stepper motors by half stepping. This is illustrated in Figure 2. In position I, the motor starts with the upper electromagnet switched on, as before. In position II, the electromagnet to the right is switched on, while power to the upper coil is kept on. Since both coils are on, the rotor is equally attracted to both electromagnets, and positions itself in between both positions (a half step). In position III, the upper electromagnet is switched off, and the rotor completes one step. Although I am only showing one half step, the motor can be half stepped through the entire rotation.

OTHER TYPES OF STEPPER MOTORS

You may run across 4-wire stepper motors. These stepper motors have two coils, with a pair of leads to each coil. Although the circuitry of this stepper motor is simpler than the one we are using, it requires a more complex driving circuit. The circuit must be able to reverse the current flow in the coils after it steps.

REAL-WORLD STEPPER MOTORS

As stated, the stepper motors diagrammed here wouldn't be of much use in the real world, rotating 90 degrees per step. Real-world stepper motors employ a series of mini-poles on the stator and rotor which improves the resolution of the stepper motor. Although Figure 3 may appear more complex than the previous figures, it is not really so. Its operation is identical, and to prove that point, we'll "step" through the illustration.

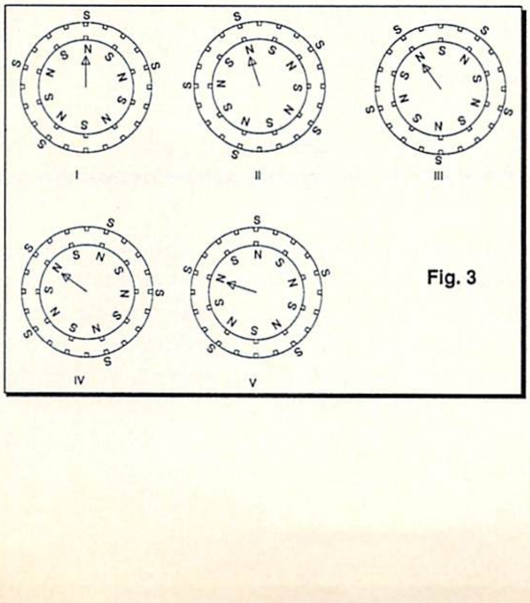


Fig. 3

In Figure 3, the rotor is turning in a counter-clockwise (CCW) rotation. In position I, the north pole of the permanent magnet on the rotor is aligned with the south pole of the electromagnet on the stator. Notice there are multiple positions that are all lined up. In position II, the electromagnet is switched off, and the coil to its immediate left is switched on. This causes the rotor to rotate CCW by a precise amount. It continues in this same manner for all the steps. Examine the pole relationship between IV and V. The rotor is still moving CCW, and in position V, the stator poles are oriented the same as in position I. This is where the sequence of electric pulses would begin to repeat itself to keep the rotor turning CCW.

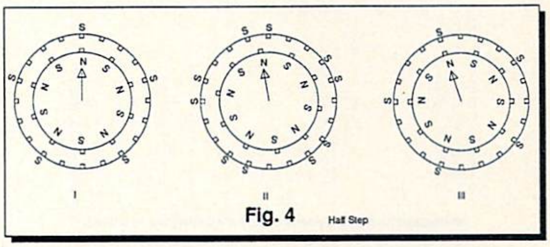


Fig. 4

Figure 4 illustrates the half step with the multi-pole position. It is identical to the half step described before.

TEST CIRCUIT

Although we are going to connect a stepper motor to the Amiga, I feel it would be a good idea to build a manual controller first. With this manual circuit, you can check and verify your wiring of the stepper motor before building the Amiga interface. In addition, it's an excellent tool to use if you are checking out a different stepper motor from the one used in this article.

Look at Figure 5. This circuit is the epitome of simplicity. Switches S1 thru S4 are normally open, subminiature push-button switches (see parts list). The four switches allow you to

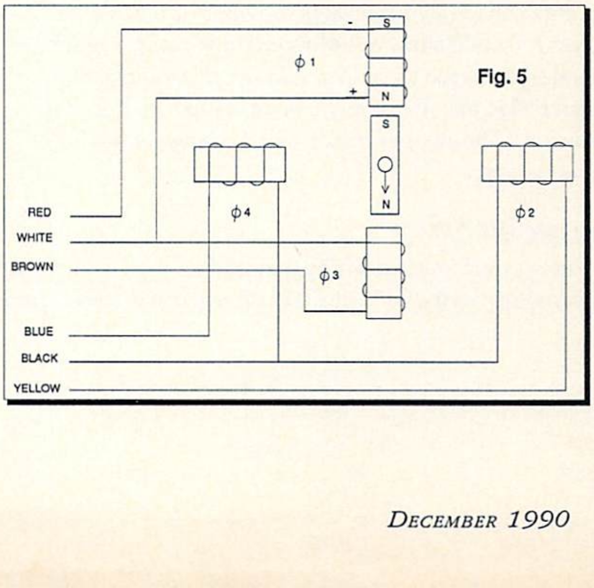
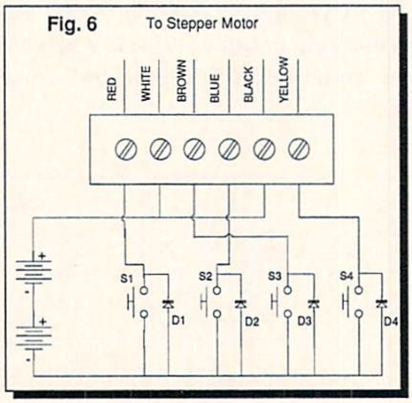


Fig. 5

drive the stepper motor manually. By changing the sequence of the steps, we can do full-step and half-step increments in either direction (CW or CCW). The diodes D1 thru D4 are used to prevent sparking, and protect the balance of the circuit. These diodes become more important when the motor is interfaced to the Amiga. The batteries used in this circuit are two small 12-volt batteries in series, to generate the 24 volts required by this model stepper motor. The rectangular box at the top of the diagram with six head screws are six PC Board Terminals interlocked together (see parts list). This simplifies connecting the wiring from the motor to the circuit.



STEPPER MOTOR

Figure 6 is an electric equivalent circuit of the stepper motor we are using. The stepper motor has 6 wires coming out from its casing. We can see from this figure that 3 leads go to each half of the coil windings, and that the coil windings are connected in pairs. If you just picked this stepper motor and didn't know anything about it, the simplest way to analyze it is to check the electrical resistance between the leads. By making a table of the resistances measured between the leads, you'll quickly find which wires are connected to which coils.

On the motor we are using there is a 60 ohm resistance between the center tap wire and each end lead, and 120 ohms between the two end leads. A wire from each of the separate coils will show an infinitely high resistance (no connection) between them. Armed with this information, you can tackle just about any 6-wire stepper motor you came across. The stepper motor we are using rotates 3.75 degrees per step.

TEST CIRCUIT DEMO

After you are finished wiring the test circuit and connecting the stepper motor, use the following table to step or half step the motor:

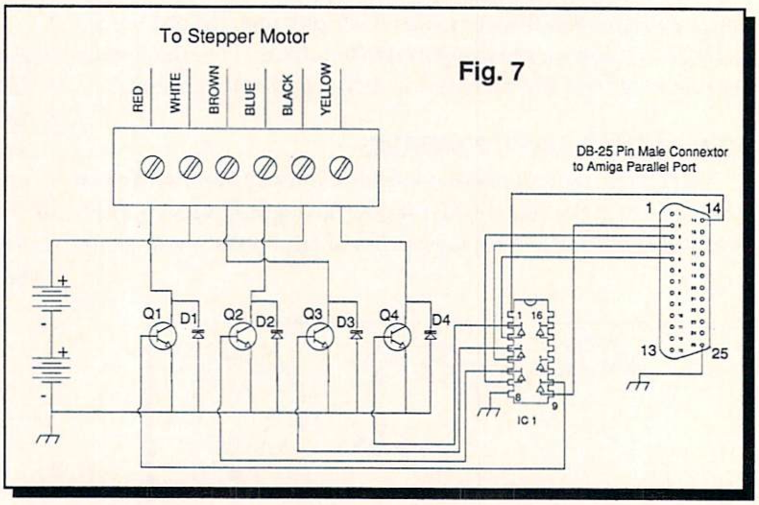
Full Step				Half Step			
S1	S2	S3	S4	S1	S2	S3	S4
on	-	-	-	on	-	-	-
-	on	-	-	on	on	-	-
-	-	on	-	-	on	-	-
-	-	-	on	-	on	on	-
				-	-	on	-
				-	-	on	on
				-	-	-	on
				on	-	-	on

When you reach the end of the table the sequence repeats, starting back at the top.

If you want to reverse the direction of travel, just reverse the sequence of the table, starting from the bottom and working to the top.

ENTER THE AMIGA

Figure 7 is the schematic for the Amiga interface. It is similar to the demo test circuit. In this circuit the push-button switches have been replaced with 2N2222 transistors. We could connect the base of the transistor directly to the parallel port. But to add a measure of safety, I placed a 4049 inverting buffer between the parallel port and the transistors. Aside from adding protection for our Amiga port, the inverting buffer provides the right logic when you power up the computer.



If you remember back to the beginning of this series, I explained that on power-up, the parallel port leads are outputting a binary 1 through a pull-up resistor. This would normally turn on all four transistors. While it is doubtful that this would damage anything, it would drain the batteries. With the inverting

(continued on page 87)

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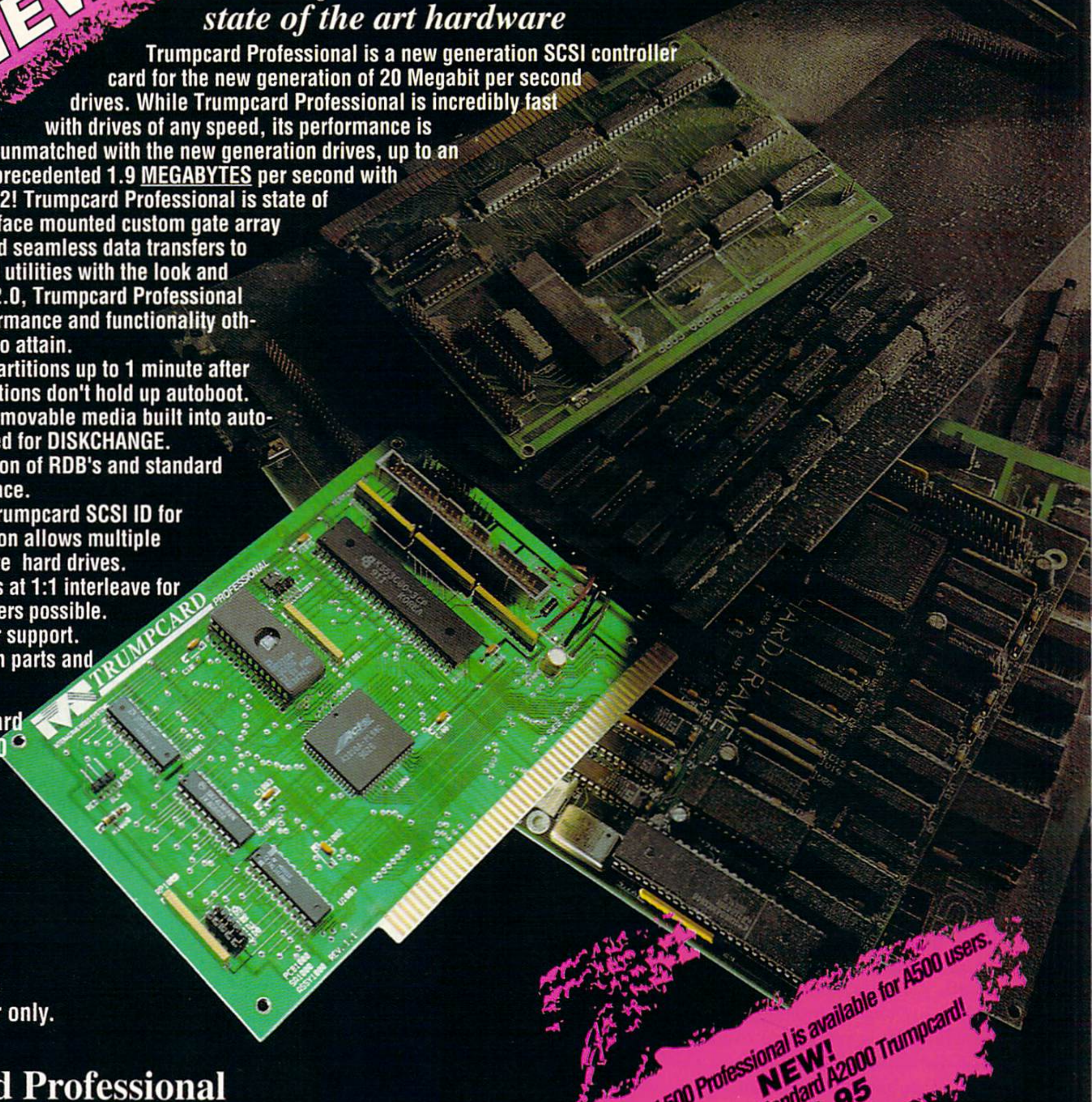

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Making A Name For Yourself:
Creating Logos On The Amiga

by Frank McMahon

IF YOU'RE JUST STARTING OUT IN your own business, there is one matter you need to address—something that is of utmost import, yet often overlooked. More vital than a genlock, framebuffer, extra memory, or hard drive—you need an identity. A name and an image. A recognizable stamp that signifies quality. Yes, you need a logo.

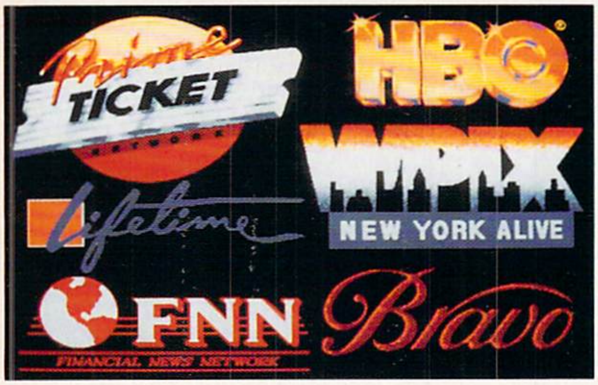

Figure 1: Examples of various cable television network logos.

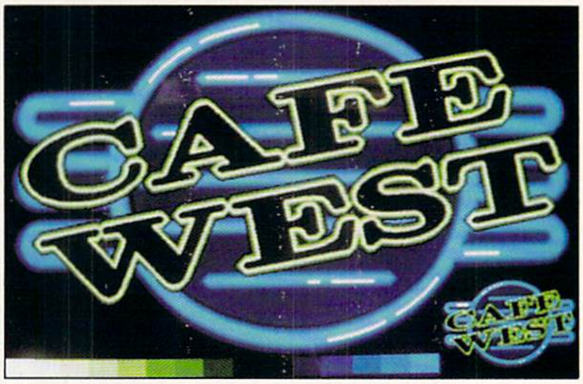

Figure 2: Logo created for talk show using 16-color, high-resolution mode.

Even if you're not creating Amiga video for fun and/or profit, or doing weddings with Amiga graphics, or creating animations for local companies. Maybe you are selling Amiga programs commercially, or distributing your work via the channels of public domain. Putting together art disks. Creating your own disk magazine. Doing graphics for cable, television or public access TV. Whatever you are doing with the Amiga—commercially or through the public—you need a logo.

If you bought this magazine at a newsstand, the first thing you looked for was the familiar "Amazing Computing" logo. It's familiar and it prompts you to pick up the magazine and flip through it. You might even purchase it as a clerk comes over and gently reminds you (his temples throbbing), "This is *not* a library."

When shopping, say, for an Amiga paint program, you might be more assured of quality or value if you spot the logo of a reputable company on the box. You are more apt to buy a program because of the company's track record; and you are reminded of that track record simply by seeing the logo (this theory is a two-way street, of course).

Further, you might be leery of a plain typeface logo that says "DAVE'S GOTTA COMPANY!", while a nice, clean, high-tech, colorful rainbow logo that says "INDUSTRIAL VISIONS" might promote you to investigate further. With software you often have to "judge a book by its cover" until you purchase it and get it home. Look at some of the software on your shelf, notice some of the different logos. (Yes, I'll wait.) Get a feel for the various styles. Look at company logos, as well as the titles of programs. Look at magazine covers. CDs or albums. You'll notice that some of the best ones are those that are the simplest. Try to grab a few of the logos that spark your interest the most and set them aside. When you create your own logo, use these as guidelines.

NOW THAT WE KNOW HOW IMPORTANT logos are, where do we go from here? An identity starts with a name—preferably a name that itself conveys a positive image of the company, even before a logo is created. If you just work now and then and really don't think of yourself as a company, create a name and start changing the way you think. Work will increase beyond "now and then".

Try to avoid using your last name and "Video". I know it's hard, but "Network Associates" will probably get a lot more work than "Anderson Video". Try also to avoid letters like "D S W". These might be the first initials of your three cats, which is almost as clever as it is cute, but it tells nothing about what the company does for those unfamiliar with it.

If you do choose letters, always follow them with what they stand for like: MTV - Music Television, or HBO - Home Box Office. Once people recognize what

(continued on page 28)

Trumpcard 500 . . .

The Only A500 Expansion System That Offers Free Hardware Upgrades for the A2000 and A3000!

Trumpcard 500 expansion cards are the same cards sold by IVS for the A2000 and the A3000. The ultra reliable *Trumpcard* SCSI disk controller, *Trumpcard Professional,* the ultimate high performance SCSI disk controller, and Meta4, a 512k - 4M fast RAM expansion card, all work flawlessly in the Trumpcard 500 expansion chassis. So when you upgrade to an A2000, 2500, or 3000, just pull the cards from the Trumpcard 500 chassis and plug them into the new computer. No problems, no sweat, no charge. It's that simple.

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Feeding The Memory Monster

The ICD AdRAM 540 and AdRAM 560D memory expansion boards for the Amiga 500

by Ernest P. Viveiros, Jr.

YOU NEVER THINK IT WILL HAPPEN to you, but inevitably *it does*: You become yet another victim of the dreaded *not enough memory error*. As the applications which you so aggressively exercise become increasingly complex, their Fast RAM (and Chip RAM) requirements become increasingly greater. Concurrently, as your Amiga skills develop, you begin tapping the power of multitasking, video, graphics—you become a power user. You try to get around your RAM limitations but, soon enough, you find you need that Fast RAM fix.

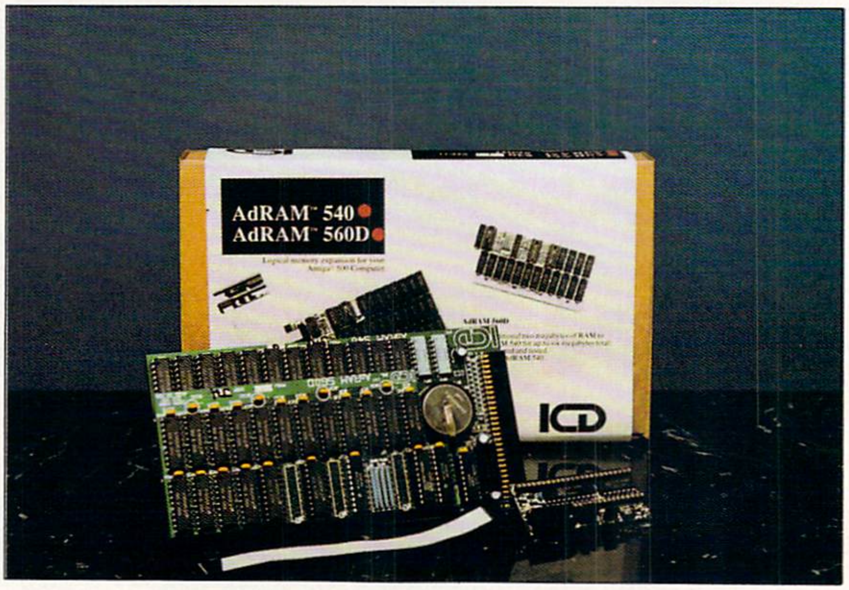
After admitting to yourself, and your wallet, that you must purchase a RAM upgrade, it's time to go shopping. It's easy to get lost in the sea of memory expansion peripherals available for the Amiga 500. However, in this heavily populated sea, a few pearls stand out. Among these are the AdRAM 540 and AdRAM 560D from ICD, Incorporated.

Using the ICD AdRAM 540, you can add up to 4 MB of RAM to an Amiga 500. The AdRAM 540 plugs into the A501 expansion connector *and* the 48-pin socket of the Gary chip on the Amiga 500 motherboard. The AdRAM also contains a battery-backed clock/calendar, which is fully compatible with the AmigaDOS setclock command. The optional AdRAM 560D daughterboard adds an additional 2 MB to the AdRAM 540, bringing the system total to 6.5 MB—enough to satisfy even the most aggressive RAM monsters!

Installation Caveats

Now, first things first. The *basic* installation of the AdRAM 540 is simple, beyond a doubt, and does not require any soldering. The AdRAM 540 includes an easy-to-follow manual to guide you step by step through the installation process. However, since you do have to open your Amiga, and move the GARY chip (a very delicate task for the weary), you very may well void your warranty (I bet you will). Also, if you choose the *advanced* installation (to upgrade Chip RAM to a full megabyte), you will be required to cut a trace on the motherboard, as well as solder two small connections.

Did I mention the anti-static precautions you'll have to take while working with the electronics? Static electricity can damage RAM chips, the AdRAM boards, and your Amiga. It happens! It would be wise to use a grounded anti-static workstation mat and grounded wristband when working with static-sensitive equipment (available from your favorite electronics supplier, or maybe a friend). In any case, if you have any doubts at all about performing the installation, have it done by an authorized dealer. It's worth the few bucks to have it done right—that is, without destroying any expensive electronics. As an added service, ICD will install your AdRAM 540 for $40.00. Contact them directly for authorization and details.



Using the ICD AdRAM 540, you can add up to 4 MB of RAM to an Amiga 500. The optional AdRAM 560D daughterboard adds an additional 2 MB to the AdRAM 540.

DRAM And More DRAM

Although you can purchase the AdRAM 540 fully populated with 4 MB RAM, you may opt to purchase the AdRAM 540 with 0 MB and populate the board yourself. Sometimes the savings can be considerable! Once again, be aware that DRAM chips are static-sensitive, and delicate (the pins bend easily). The AdRAM 540 takes up to 32 (256K x 4 120 ns) DRAMS in groups of 4 (512K increments). Since the board is upgradeable in 512K increments, it's a good choice for those who want to upgrade slowly at first, yet build on a solid upgrade path. Compatible DRAM chips include the Intel 21014, TI TMS44C256, and Siemens HYB514256. A complete list of compatible DRAM chips is included in the manual.

Power Hungry

For most power users, the AdRAM 540 fully populated with 4 MB will be enough. But for those RAM-discriminating power users—those veritable memory monsters—there is the AdRAM 560 2 MB daughterboard for the AdRAM 540. The AdRAM 560 comes fully populated with 2 MB DRAM and easily installs piggyback on the AdRAM 540. Even if you don't choose the AdRAM 560 option, you can always get that extra 2 MB fix in the future. Installation is literally a snap.

Getting The Most From Super Agnus—More Chip RAM!

As previously stated, the *basic* installation of the AdRAM 540 is relatively easy. The most difficult (or delicate) part of the procedure is the removal and replacement of the Gary chip. This basic installation is used if all the added RAM is to be used as Fast RAM. However, if your Amiga 500 is equipped with a Super "fatter" Agnus, there is an *advanced* installation which will allow you to get a full megabyte of Chip RAM (graphics RAM) instead of the usual 512K.

To determine whether or not your Agnus chip is a Super Agnus chip, locate the Agnus chip on the Amiga 500's motherboard. It is to the left of the Gary chip and should be marked "Fat Agnus". Check the first set of numbers on it. If the numbers are 8370 or 8371, then you *do not* have a Super Agnus. If the number is 8372 or higher, it *is* a Super Agnus chip.

The advanced installation is a little too tricky to be performed by a novice. The procedure requires cutting a trace on the motherboard as well as soldering a few minor connections. It's very easy to damage the computer with a hot soldering iron. Understandably, this is not the kind of procedure to learn by trial and error. Rather, it is best left to qualified individuals.

Software Installation

Once the hardware is installed, boot it! The first 4 banks of the expansion memory (2 MB) are automatically recognized by the Amiga. The remaining 2 MB (or 4 MB with the AdRAM 560) is recognized by the system by using the supplied AdRAM program. Just copy the AdRAM program to the SYS:C directory, and add the AdRAM command to your startup-sequence. The AdRAM program can also be run from the CLI. The AdRAM 540 boasts 100% software compatibility, unlike some other boards...

ICD also supplies an extensive memory tester, MemTest. When run, MemTest will test *all* memory in your system and report on any errors found. The unlikely event of a memory failure is usually caused by defective or improper installation of DRAM chips. ICD states that all AdRAM 540 and 560D units are thoroughly tested before leaving their facility.

Don't forget about the clock! The clock on the AdRAM 540 is completely compatible with the AmigaDOS SetClock command. A nice feature of the AdRAM 540 is that the clock battery is socketed, and can be easily replaced at the end of its 3 to 5-year life.

Compatibility?

The AdRAM 540 and AdRAM 560D are fully compatible with any revision Amiga 500, and fully support all KickStart versions 1.2 and greater There should be no software compatibility problems. However you should be aware that the AdRAM 540 (with or without the AdRAM 560D) reduces the total system auto-config address space from 8 MB down to 4 MB, regardless of the amount of RAM installed. This means that you can add a maximum of 4 MB of auto-config devices (RAM cards, or hard drives with RAM cards) on the expansion port.

> *You try to get around your RAM limitations but, soon enough, you find you need that Fast RAM fix. Enter: ICD's AdRAM expansion.*

Conclusions

I can only say good things about the AdRAM expansion. It's a good, solid (built like a brick!) product, that's easy to install, and backed by a 1-year warranty. Most important, it works flawlessly, like a RAM board should. The workmanship and quality of ICD's Amiga products is most impressive, and it would appear that ICD will be a key player in the Amiga hardware market. Overall, the ICD AdRAM 540 and AdRAM 560D combination is an excellent choice for any Amiga 500's RAM upgrade path. •AC•

AdRAM 540: $159.95 (0K), $275.95 (2MB),
$391.95 (4MB)
AdRAM 560D: $243.95 (2 MB)

ICD, Inc.
1220 Rock Street
Rockford, IL 61101
(815) 968-2228
Inquiry #208

*(**Logos**, continued from page 24)*

the company does, you can drop the explanation (as did those two networks). Working at a cable television studio, I deal with network logos all the time. We create logos on the Amiga as well as digitize existing logos to create ads. We also use logos in producing local shows. Look at the logos in Figure One. In the lower left is a logo for the Financial News Network. FNN presently carries the full title of the network following its letters/logo. In the upper right, see that HBO does not because HBO has been around long enough that if you don't know what it is, you probably can't get it anyway.

The next thing to decide is which paint program to create your logo in. The best bet would be a standard IFF paint program that lets you draw in hi-res (640 x 400) mode.

This is definitely the best platform for logo creation because it gives you the added resolution and sharpness needed for a classy look. It is possible to use a HAM paint program to create, but try to stick to using the first 16 colors in the palette. Using colors beyond the first 16 may create fringing, which would be unappropriate for the clean look we're trying to achieve.

An IFF hi-res paint program is also easier to animate. You can bring your logo into DeluxePaint III and animate it, or create Digital Video Effects (DVE) with a program such as Pro Video Post or Animagic. In fact, if you get real adventurous, you can process your logo through a conversion program such as DigiWorks 3D and create a 3-D logo for animating in dedicated 3-D programs such as 3-D Professional, Sculpt-Animate 4D, or Turbo Silver/Imagine. Or, render the 3-D object to a framebuffer board like NewTek's Video Toaster, Impulse's Firecracker 24, or the Mimetics Framebuffer for full 24-bit, 16-million color accuracy.

OK, SO WE'RE GETTING AHEAD OF ourselves. The point is, if you are going to create a logo, do it first in hi-res 16 color. For the following examples I'll use DeluxePaint III.

Another major advantage you'll discover in hi-res is that you can change the size of the logo and not suffer too much loss of detail. If you create a logo that is about full screen, using DeluxePaint III you can stretch as well as halve it without losing very much.

Look at the logo in Figure Two. This logo was created in DeluxePaint III using hi-res with the 16 colors pictured. In the lower right of the screen is the same logo reduced (to about 1/16th the original size); it still retains almost all of the detail. We were starting up a new talk show and needed a logo to promote it. Since the title of the show was "Cafe West" and the set resembled a corner restaurant, I thought the logo should look somewhat like a neon sign you would see swinging overhead the door of a real cafe.

The first step involved creating the blue background circle. This was pretty easy, using the Draw Circle commands (in outline mode). To get the designs on the side, I created one on my swap screen, and then attached it in three places on the side of the circle. After that, I picked up the left side of the circle as a brush, flipped it, and then stamped it down on the right side. I created a spread of blue using 6 colors, and drew the circle and designs using the brightest blue. I made sure the inside of the circle was the same color as the background color so when I picked it up as a brush all I got was just the blue outline, designs on the side and rods in the center.

Once it was a brush, I chose the next darkest blue in the palette and used the Outline command in DeluxePaint III (hit lowercase "o" on the keyboard) to add a darker blue edge to it. I repeated this again 4 times, each time giving it a darker blue edge, going through the blue spread until I was at black. The end result was a rounded tube neon effect. I also kept the volume of the colors high (they should normally never be above 12 when going onto video) so they would glow brightly when we went to use it for the show. The glints of light were drawn in after. I chose blue as a background color because blue tends to give a feeling of solidity and doesn't overpower the foreground. Color research will tell you that different colors create different moods. For example, red usually alerts the viewer, blue sometimes prompts trust, and red and yellow are famous for promoting hunger. There are many books on the subject worth looking into. I chose the blue and green for a kind of foreign, tropical feel.

NEXT UP WAS THE TEXT PART OF THE logo. The easiest way to create the text is to take an existing font from the hundreds available in the Amiga commercial and public domain libraries. Don't immediately go for a Kara Font, or pick a font included with an existing paint program, and please promise to stay away from the Amiga fonts like topaz. These fonts are all widely used and too recognizable. Pick a font more obscure. Something off the beaten path. I chose an existing font that was pretty basic and thick enough to be important looking. To create the text logo I used the same technic outlining with the color spread of green to give the same neon look. I then filled the letters in with the color black so the bright green edges would be even more noticeable. The next step was the important one. I used the "rotate" command in DeluxePaint III to shift it about 20 degrees. Using "rotate" and "shear" in DeluxePaint III will greatly enhance the effectiveness of your end result.

How? Well, in the viewer's mind, the background is nice and symmetrical, and the same is expected of the foreground. When it isn't, it grabs their attention. It's an old trick that still works, and much of the reason why "Italic" letters have become the legends they are today.

Even though I used a basic font unchanged, it is still a good idea to alter a certain font when you can for a more unique look. Basically, when you type out your logo, sit down and play around with the letters for a while. Change them. Alter them. You'll be surprised what you can create with a little experimentation.

WHILE THIS ISN'T MEANT TO BE A crash course in font design, it is meant to stimulate some ideas and get you thinking. The important thing is to figure out what kind of mood or feeling you want the logo to bring about when the viewer spots it. Keep it simple but eye-catching, classy but humble. Use it on everything. Print it out and include it on your stationary. Genlock it over the beginning and end of all your video productions. Your symbol is going to represent you when you can't be there in person—so make sure it *works* for you.

•AC•

The Best Assembler

Macro68

Suggested retail price: US$150

Macro68 is a powerful new assembler for the entire line of Amiga personal computers.

Macro68 supports the entire Motorola M68000 Family including the MC68030, MC68882 FPU, and MC68851 MMU. The Amiga Copper is supported also.

This fast, multi-pass assembler uses the new Motorola M68000 Family assembly language syntax, and comes with a utility to convert old-style syntax source code painlessly. The new syntax was developed by Motorola specifically to support the addressing capabilities of the new generation of CPUs.

Macro68 boasts macro power unparalleled in products of this class. There are many new and innovative assembler directives. For instance, a special structure offset directive assures maximum compatibility with the Amiga's interface conventions. A user-accessible file provides the ability to customize directives and run-time messages from the assembler. An AREXX(tm) interface provides "real-time" communication with the editor of your choice. A number of directives enable **Macro68** to communicate with AmigaDos(tm).

Possibly the most unique feature of **Macro68** is the use of a shared-library, which allows *resident* preassembled include files for incredibly fast assemblies.

Macro68 is compatible with the directives used by most popular assemblers. Output file formats include executable object, linkable object, binary image, and Motorola S records.

Requires at least 1 meg of memory.

ReSource, the powerful disassembler for the Amiga that has received rave reviews, now has a big brother.

Like the original version, **ReSource'030** will tear apart your code like no other program. And it will do so even faster now, because **ReSource'030** is written in native MC68030 code. This means that it won't run on a vanilla 68000, but will fly on an A3000, or another machine with a 68020/030 board.

ReSource'030 supports the new Motorola M68000 Family assembly language syntax, and is a perfect companian to **Macro68**.

If you're new to **ReSource**, here are a few facts: **ReSource** is an intelligent interactive disassembler for the Amiga programmer. **ReSource** will enable you to explore the Amiga. Find out how your favorite program works. Examine your own compiled code.

ReSource will load/save *any* file, read disk tracks, or disassemble directly from memory. Symbols are created automatically, and virtually *all* Amiga symbol bases are supported. Additionally, you may create your own symbol bases.

"If you're serious about disassembling code, look no further!"

The original **ReSource** continues to be available for owners of 68000 based machines. Both versions of **ReSource** require at least 1 meg of ram.
Suggested retail prices: Original **ReSource**, US$95, **ReSource'030**, US$150

ReSource

The Best Disassembler

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McGee & McGee Visits Katie's Farm

Two graphically potent programs, designed for early learning, enter the Amiga educational arena

by Jeff James

AT FIRST GLANCE, THE AMIGA APPEARS to be the ultimate educational computer. With colorful 4096-color graphics, 4-channel stereo sound, easy-to-use operating (icon-based) system, and built-in speech synthesis capability. There is no doubt the Amiga is indeed something special. Throw in the fact that the Amiga has the best price-to-performance ratio on the market and you've got a powerful argument for America's schools switching over to the Amiga.

Still, the Amiga has yet to attain its deserved recognition in the educational market. Thankfully, the times, they are a changing. Commodore has recently made some progress in pushing the Amiga into the educational sector, and major educational software developers like Davidson and Broderbund have recently begun supporting the Amiga. A new affiliated label of Broderbund, Lawrence Productions, has two new offerings that begin to fill the void for early learning (ages 2-6) software on the Amiga.

McGee and McGee Visits Katie's Farm are two colorful packages geared towards very young children. In the former, the user operating the program essentially plays out the daily activities of the main character, a small child named McGee (the character is asexual). After the game has loaded, the user is presented with the initial playing screen, which shows McGee in his bedroom right after sunrise.

The upper three-quarters of the screen consists of a beautifully drawn picture of McGee and his present location. The lower quarter consists of smaller pictures of four objects in that location.

For example, in the first screen of the program (McGee's bedroom at sunrise), a pajama-clad McGee is shown looking at the toys in his room. In this screen, McGee can play with his rabbit puppet, ride his stick horse, bounce his ball, or leave the room. All of these options are indicated by the four pictures displayed at the bottom of the screen. When the picture of the stick horse is selected, McGee is shown riding the toy around the room while the digitized voice of a child giggles and shouts "Giddy Up!" If the picture of the door is selected, McGee next appears in the hallway, with four new options confronting him.

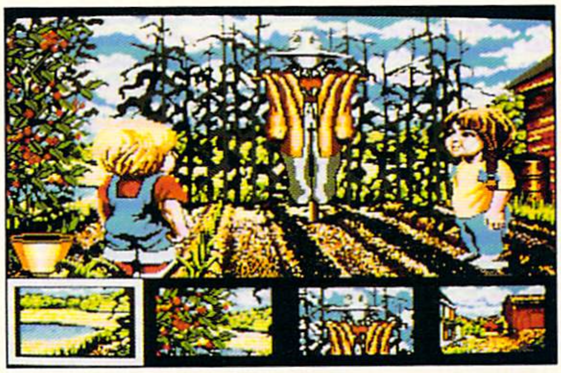
McGee moves from room to room, and the child can direct him to give a puppy a biscuit, turn on the TV, crawl under a rug, swing in the tire-swing in the front yard, and even peek through a hole in a fence. All of this is being done while his mother is fast asleep upstairs.

In the second program, Katie's Farm, McGee is shown visiting his cousin Katie. This encounter takes place at her farm in the country. The format for this game is the same, but Katie accompanies McGee as they explore the farm, gathering eggs, catching fish, milking cows, etc.

The graphics and animation of both programs are first-rate, and the digitized voices of real children and animal noises add immensely to the fun of both games. The game is not copy-protected, and is fully hard-disk installable.

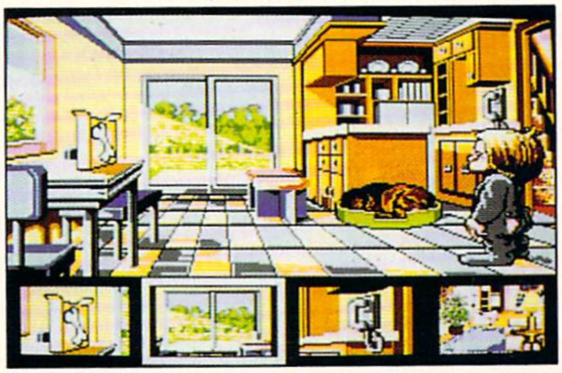
Although the playing interface is amazingly simple to operate, the graphics, animation, and sound of both games are excellent. However these two programs fall short in two regards: slow gameplay and the effectiveness of holding children's attention.

On a single-drive Amiga with only 1MB of RAM, loading either of these programs takes an agonizingly long time. While these long loading times are undoubtedly due to the large amount of storage and memory space that the colorful graphics and digitized sounds require, practically every action of the program after loading still takes a lengthy disk load. When tested on an Amiga equipped with extra RAM and a hard disk, both programs were appreciably faster, but still not very snappy.



Down on the farm: McGee visits Cousin Katie in *Katie's Farm*

Stay in, get things done: McGee at home in *McGee*



I tested these programs on my 2-year-old niece and my 5-year-old nephew, and both were drawn to the excellent graphics and sound. But, as any person who is around small children for even a few minutes realizes, the attention span of any human under the age of ten is remarkably short. So trying to keep Samantha's eyes glued on the screen and Nathan interested in making Katie and McGee gather eggs in the henhouse between disk loads was an ordeal.

My niece had fun making McGee do various things, but there simply weren't enough actions or locations to keep her interested in the entire game for long. In McGee, there are only 16 different activities to undertake. Katie's Farm seems to have more locations and more variability with the sounds, but not enough to keep my Nintendo-weaned nephew interested for very long.

Yet even with these understandable shortcomings, McGee and Katie's Farm are both welcome additions to the Amiga market. They fill the glaring gap in the low end of Amiga educational software nicely, and the entrance of Lawrence Productions into the Amiga educational market serves as a sign that the Amiga is making some headway there.

I recommend either of these programs to Amiga owners with patient children, hard disks, and more than 1MB of RAM. But trying to boot these programs on a single floppy, 1MB machine is an exercise guaranteed to make you rush out and buy that hard disk. The best solution is to see if your local Amiga dealer will let you try the program in the store, then gather up the little ones that will be the target audience of the program and try it out on them before making the purchase.

These programs would be excellent candidates for use on Commodore's hot new CDTV, where the immense storage space of CD-ROM technology would allow both of these programs to live up to their full potential.

•AC•

McGee
Inquiry #209
McGee Visits Katie's Farm
Inquiry #210
Price: $39.95 each
Requirements:
512K RAM (1MB for Katie's Farm)
by Lawrence Productions
distributed by Broderbund Software
17 Paul Drive
San Rafael, CA 94903
(415) 492-3500

Season's Greetings

This year, let us take care of your
Holiday gift wrapping!

With all that is happening
in the Amiga market,
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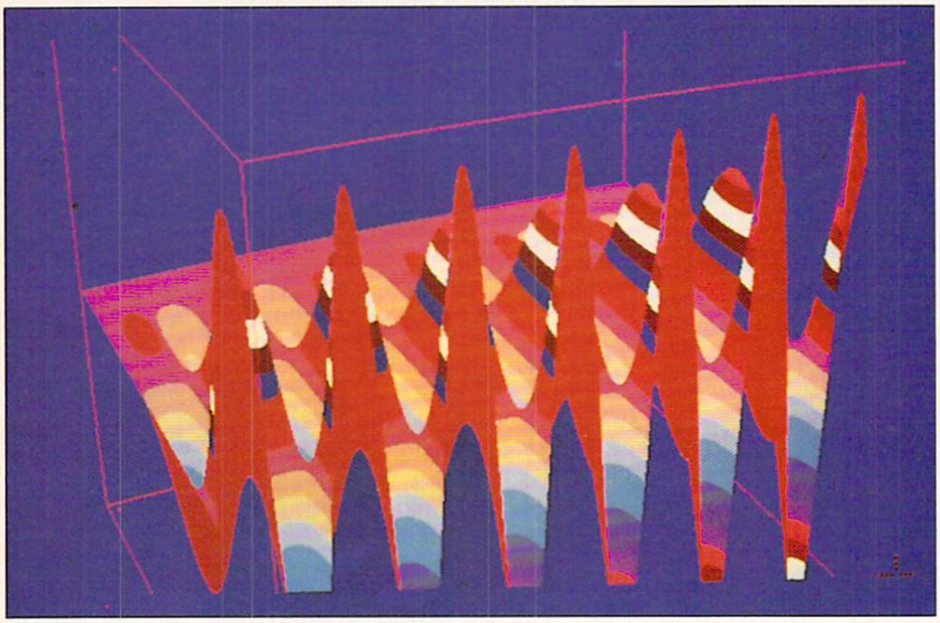
MathVision 2.0

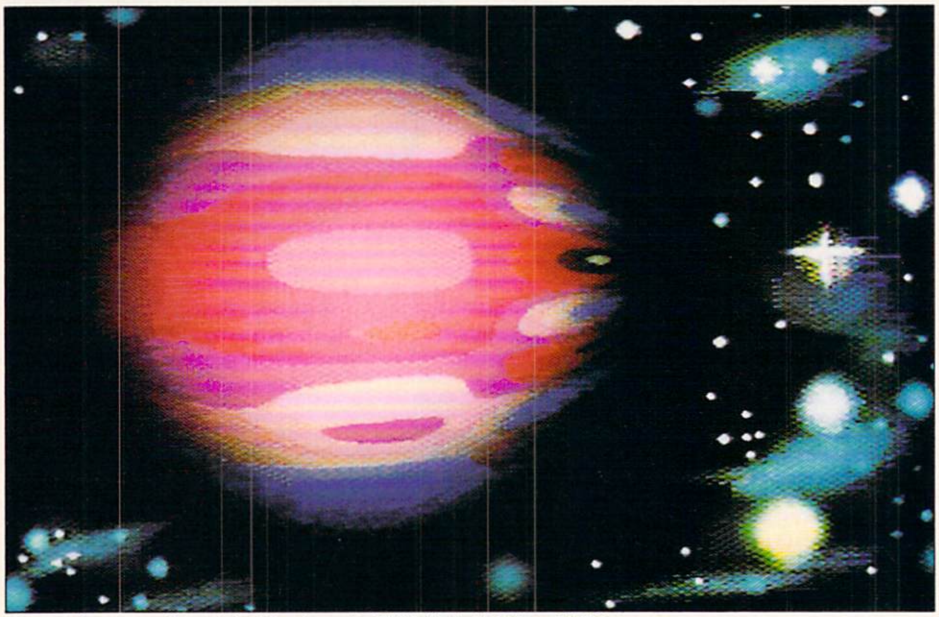
by R. Shamms Mortier

THERE ARE TWO WAYS THAT COMPUTER GRAPHICS CAN BE APPROACHED, and each way has its defending camp of supporters. The first method is that anyone can "do" computer graphics, and is limited only by the software at their disposal. The Amiga community is well acclimated to this road, as any of the drawing/painting/animation competitions will show. To enter these contests, one has only to purchase this or that piece of software for the Amiga, then launch on a standard artistic exploration until the final results are achieved. All of the Amiga computer magazines are filled with superlative samples of computer paintings and animations executed in this manner.

There is a second opinion, however, concerning the "validity" of the final computer graphic results, which is represented by a very entrenched and vocal community of individuals. In this entourage, it is expected that the computer "artist" be in possession of some pretty intense programming skills as well as visualization abilities. Folks who use second party software, instead of writing their own, are not considered "computer artists", but just traditional artists not really capable of tapping into the revolutionary aspects of this new medium. Commensurate with these views, it is not so much the "result" of computer art that counts (that is, not the actual beauty of the picture as such) but is more the beauty and novelty of the programming method and its use. This estrangement and division has gotten so strong in recent years, that it has caused a real and elitist rift in those who would seek to define "computer art".

You can understand the validity of each side with a little reflection. The traditional artist that finds her or his way to the Amiga (or any other computer) wants very little to do with "programming" as such. For that person, programming is for programmers. After all, that same artist would not be expected to know how to manufacture a paintbrush in order to use it. On the other side of the argument are those who feel that computer art cannot be understood as a new medium, or valued in its proper framework, until some level of programming skill is learned. To those individuals, the real art in computer art is the transformation of data into visual perception. In that camp, the real core of artistic expression is the power behind the visual, the thought process that actually creates the transformation in the mind long before it reaches the screen. For the second group, there is a feeling that the artist cum programmer represents the best of the renaissance person, the scientist/artist of the coming millennium, and this person represents the leading edge of the new artist/scientist model.





above: A perspective plot of the formula,"X^2/4*sin(Y-2)*cos(X-5)".
below: The formula "X^2/4*sin(Y-2)*cos(X-5)*X-Y^2" executed in Interlace/Half-Brites in MathVision's Contour plotting mode, ported to NewTek's DigiPaint 3.0, and wrapped (texture mapped) around a pseudo-spherical shape. It makes for a nice simulated planetary body.

I'm not only unsure about who is "right" in this debate, I'm not even sure where I stand. For the past several years, I could identify myself mainly with the artist of the first encounter, a person who uses Amiga visual software to focus upon certain aspects of a planned end product, whether in music, graphic design, electronic painting, or video animation. But my grounding (the beginnings of my education as with many other Amiga obsessives) contained some pretty heavy programming courses. I'm sure they have at least strengthened my awareness for what I appreciate in Amigaville. Recently, the distinction between the two seemingly opposing camps (to program or not to have to) has been blurred with the introduction of a host of icon based programming tools that cause a person to wonder if they are indeed programming or just using another second party software tool (all of the Amiga multimedia programs are included in this category, as well as a group of icon based computer "languages" that substitute macro-level commands for distinct action modules). In a sense, MathVision and many of the other fractal generation tools that Amiga artists might use fall into this new category. With them, one can claim to be primarily "programming", especially those who have some background in mathematics and geometry. They are all clever pieces of software, however,designed to appeal and be useful to both the camp of traditional artists newly become computer artists, and those to whom mathematical algorithms are familiar and understandable.

MATHVISION

MathVision is based upon an earlier Seven Seas Software release called "Doug's Math Aquarium". Aquarium was a very nice work that allowed users to create a range of visuals based upon selected mathematical formulas. Aquarium was definitely meant as an artist's tool, and not so much a programmer's. With some experimenting and manipulation, you could produce amazing and visually pleasing IFF visuals in this somewhat limited realm (all of the pictures and formulas created with Aquarium can be imported into MathVision). With the release of MathVision, the software definitely reaches into the new vague programming/non-programming ground. In other words, the software can allow anyone to create astounding visions of math and geometry, but it allows those with mathematical skills to push the limits beyond the edge. MathVision is accompanied by a thicker and more complex manual than Aquarium, befitting its new expanded openness to internal manipulation.

Conventions

MathVision can be described as an infinite contour mapping program. Contour maps show horizontal/vertical coordinates on a two-dimensional plane as X/Y data. "Z" data, that pertaining to "height" or intensity is shown as variations of color. We've all seen these maps. Elevation is depicted in shades of colors in increments of measurement, perhaps changing the color of a mountain with every hundred feet of elevation. MathVision allows you to see the multidimensionality of a specific mathematical formula in three ways: inscribing it on a simple 2D plot, a contour plot, or a 3D perspective plot. The first method might be useful for XY associated data and business graphics, the second for IFF paintings and standard 2D contour mapping results (which can color cycle for animated uses). The third method for needs that would make use of 3D visualizations of the data (either for scientific purposes or aesthetics).

There are two screens that MathVision uses, a data screen where formulas are added and manipulated, and a picture screen that shows the visual results that the formula creates. Users familiar with Aquarium will get a jump start on the use of MathVision since many of its functions and its general "look" remain unchanged. Like its progenitor, it also contains a special color menu which was also released as a separate product: Doug's Color Commander. This is a superlative color palette device unlike any other Amiga palette requester in both scope and option. It is laid out like a variable histogram and gives you all of the palette controls you would ever want or need, including separate sliders for adjusting the RGB and HSV of any palette color, individually or in unison. Spread and Cycle Ranges can be set interactively with the mouse.

The Sampling Delta and Other Tools

The "Sampling Delta" in MathVision can be compared to the sampling rate in a sound sampling device. The higher the sampling rate of sound, the more nuances and harmonics are captured. In MathVision, the lower the sampling delta number (in a 0 to 7 range), the finer the pixel display of the graphic. A sampling delta of 7 gives a very blocky and coarse look to the visual. "Sampling Delta" settings can be set in any of the three MathVision viewing modes: Simple, Contour, and Perspective. Lower sampling delta numbers produce apparent increases in the resolution of the visuals, but at a somewhat longer rendering time.

One of the nicest features of this program is the ability to zoom in and out of the visuals. If you do this selectively and save each of the IFF frames, you could use the sequence of results as animation frames. There are two separate zooming modes. The first is a percentage setting in global references, meaning that a setting here of 50% will produce a visual that fills the screen with twice the information that your last picture contained. It will seem that your picture has been zoomed out of, and that you are "farther" to it. Setting a series of 90% (or other settings from 99% to about 85%) settings in this requester and saving each of the generated visuals will give you frames just right for animation sequences. To zoom in closer, one would set the requester number at a larger then 100% setting. Zooming globally often produces amazing and unexpected results, especially when the percentage jumps are relatively large (10% or 200% for instance). All changes in the zoom settings are reflected in real time in the data listings on the Edit (data) screen, and each time the percentage is rest, it effects the last rendered frame. The second method of changing zoom settings resides in both the "simple" and "contour" settings, effecting each as you use them to create visuals. These are both "Zoom In" changes, and with each, a quarter size screen box appears and is controlled in the XY dimension by mouse movements. Clicking freezes the box in place, and the next time you render the formula, it is that screen area framed by the box that will be painted in. This is good for incremental jumps and experiments, and not necessarily for animated sequences. In the Perspective mode, there is a similar setting called "Magnification".

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The Three MathVision Visual Modes

1. The "Simple" Mode

"Simple" plots are basic XY plots of the screen data, allowing you to see at what points along a curve of the data the X and Y values are set at. This can be a great analytical tool for statisticians wishing to get readings on various points of the XY curve. It can be made very complex by the depth of the formula and your understanding of the math involved. Setting "analyze" on the Edit screen under the Simple menu choices changes your mouse movements into displayable data points along the bottom of the graphics screen. You set the Xmin and Xmax data after inputting a formula, and then select "Guess Ymin Ymax" to automatically set the Y parameters for the curve and the other data settings displayed. Obviously, the more complex your formula, the more interesting and detailed your data curve.

2. Contour Mode

Contour mode uses the general formula Z=f(X,Y) to generate visuals. "Z" is plotted as a color value, and its position is related to the relationship of the X and Y coordinates at every plotted point on the screen. Other options not mentioned thus far under the Contour menu include: **Center** (centers the screen over the point selected for the next plot, and is a great way to pan several frames for an animated sequence); **Stipple** (allows primitive drawing on the visual); **Scaling** (normally toggled ON, this allows plotting in a nice range of system selected colors. It can be toggled OFF, making colorization more random and chancy); **Calibrate** (provides a scale for the colors); **Clipping** (selects how the color map is to be applied to the rendering).

3. The Perspective Mode

Not discussed so far are several settings and functions of this mode. The first is that the perspective data can be analyzed, but getting used to movement and the respective data in 3D is not as easy as in the other modes. "Viewpoint" allows you to adjust the visual settings of a 3D box in real time which shows you the orientations in 3D space of the plot. You can also Scale the Height of the plot, maximizing the perception of the data display. Magnification can be adjusted to fill the screen with the plot if desired. Several settings under "Switches" effect the nature of the plot:

Perspective can be toggled to display either a true perspective of the data, or an isometric plot.

Hidden Lines toggles between a wireframe plot and a full color plot.

Clip To Box either forces the plot into the viewbox or allows it to spill over.

Draw Box toggles the box frame off or on.

Color Top allows the top of the Perspective Plot to be colored as is the Contour Plot, while Color Bottom does the same for the underside of the Perspective Plot.

Hooks

"Hooks" are auxiliary programs to MathVision, and are not easy to learn to use correctly. The manual claims that they are easy for C programmers to write, and their creation is encouraged for future revisions and upgrades. An additional "Read Me" file on the release disk contains a series of operations which allows you to translate data in a text file format to an "MTRX" file for constructing "Hooks". In my experimentation, I have had problems learning to use the Hooks effectively, and wish that they were implemented in the programs Edit screen so that they could be loaded and deleted easier. Perhaps those users leaning more heavily upon their mathematical background then their artistic experience will have more success in this area then I have had. Although each of the separate Hooks are explained in the manual, I think a separate tutorial regarding the extensive use and idea behind Hooks is needed for novice users. And again, I would like to see Hooks loaded directly in the editing screen, which should make their application a lot clearer.

Conclusion

No matter at what level your artistic and/or mathematical skills reside at, MathVision will provide hours of fun and wonder. ARexx users will be happy to know that MathVision is ARexx compatible. The disks are not copy protected, and a module exists for copying the program to your hard disk. There is both a standard and an accelerator version included for 68020 and 68030 users. The manual is professionally executed and extensive. The program is only limited by your imagination and experimentation, and you may indeed consider yourself a "programmer" as well as an artist when you search out its depths. With MathVision, you can create an unlimited number of unique graphics and animation frames, while achieving a first hand look into the visual realms of chaotic math and the fractal dimension. You may even learn to accomplish the heretofore impossible, "seeing" how mathematics works. Enjoy! See you in ROMulan space.

•AC•

MathVision version 2.0
Price: $197.00
Seven Seas Software
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Port Townsend, WA 98368
206-385-1956
Inquiry # 216

A Hard Disk Primer for Floppy Users

by Rob Hays

FINALLY, AFTER MONTHS OF SCRIMPING, SAVING, planning, and maybe even telling a few white lies to your spouse, you're about to get a hard disk for your Amiga. This article is intended to make the transition from floppies to hard disk a little easier.

First of all, some basics (feel free to skip this part if you find yourself thinking, "Everybody knows that!"). We've all had the experience of showing off our computer to someone who picks up a floppy and says, "Is this what they call a hard disk?" You have to explain that it is still a floppy disk, even though it is encased in a hard plastic shell.

There are, of course, similarities. Both floppy and hard disks record data as changes in magnetic polarity and both spin a disk coated with a thin film of fine metal particles. The terms "floppy" and "hard" disk refer to the substrate to which this film is applied. Floppies typically use Mylar, which is flexible, while hard disks coat a metal platter. They both use a device called a read/write head to detect or alter the magnetic patterns on the disk as it passes underneath.

With floppy disks, this head actually touches the disk as it rotates, much as the heads in a cassette player touch the tape as it passes by. You need to clean the heads periodically to remove the inevitable build up of metal particles rubbed off the media as it passes.

Hard disks, on the other hand, use a head design that actually "flies" above the surface of the disk. This eliminates the rubbing off of metal particles, but introduces another potential problem. Since the platter spins at about 3000 rpm (floppies spin at 300 rpm), and the delicate heads fly a few ten-millionths of an inch above the surface, any particles of dirt, dust, hairs, etc. that get onto the disk will destroy the head when the two collide. This is why hard disks are assembled or repaired in immaculate, NASA-style rooms, and sealed in a box you should never even consider trying to open.

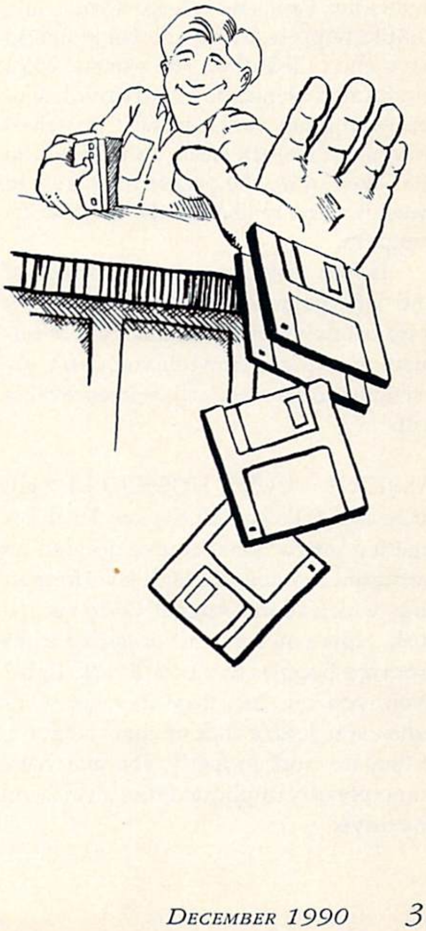
Another major difference is the number of surfaces with which you can work. Modern floppies have two sides. Hard disks also have two sides per platter, but usually several platters per drive, which is why large amounts of storage are available in physically small packages. For instance, the drive I bought (a Seagate ST157N-1) has three 3.5-inch platters with six surfaces and heads, and a formatted capacity of 48 megabytes.

OK. THAT COVERS THE BASIC physical differences between floppy and hard disks, but you use them the same way, don't you? Just copy all of your floppies onto the hard drive and take off, right? Well, yes and no.

If you bought your hard drive and controller already assembled and formatted, it probably has a slew of utilities and other programs already on it. You've already had some experience with how fast the icons appear when you open a window. If you got a "naked" drive, then it isn't usable immediately.

Before you can use the hard drive, you have to format it, just like a floppy. With floppy disks there is only one kind of formatting to perform, while hard disks require two types. During the first, or low level, format, the drive controller is basically mapping the surfaces of the platters. No matter how perfect the manufacturing process, there will be sections of the platters that are unusable for one reason or another. During this phase, the controller is building a list of sectors to avoid in the future.

After completing the low-level format, you have to decide about partitions. Simply put, partitioning a hard disk makes AmigaDOS believe you have five 10-megabyte hard disks instead of one 50-megabyte disk.



There are several reasons why you should partition your drive, and only one reason you might not want to. One reason to partition is speed. AmigaDOS can display directories and files faster if it doesn't have to wade through an entire 50MB disk looking for them. Another reason is safety. If something happens and you have to reformat a partition, the most you can lose is whatever was added to that partition since your last backup.

The only negative to multiple partitions is that each partition must be MOUNTed before it can be used. Each one will take between 13K and 28K of RAM for use as buffers, that can only be returned to the system by rebooting.

By the way, if you have Kickstart 1.3 or later, and if your hard drive/controller allows it (check the documentation), you can boot directly from the hard disk without using a floppy at all. This requires a small partition using the standard (or old) file system. The other partitions should all use the newer FastFileSystem handler.

So, you've decided multiple partitions are for you. Now what? Decide how many and what size partitions you need. My disk has seven partitions; you may decide three is enough. You can name them John, Paul, and George if you want, just like floppies, but you probably should have one called dh0:. The reason? Most programs that include a hard drive installation program want to install themselves on dh0:. It's much easier to let them do that, then move the program where you want it, than to change the installation program.

If your disk came already formatted and with programs on it, be sure and back it up before you attempt any kind of formatting or partitioning. If you don't, everything on the disk will be irretrievably lost.

ALRIGHT. YOU'VE HOOKED UP THE drive and followed all the low-level formatting instructions. You've decided on partitions and done the high-level formatting, which allows AmigaDOS to use the disk. Now you can start dragging icons from the floppies to the hard disk, right? Well, you can, but they may not work when you double click on them later. Or, if they do work properly, you may have unnecessarily duplicated files already on the drive.

A very handy utility at this point is one of the many directory utilities available either commercially, like CLImate or Diskmaster, or shareware like Browser. These allow you to manipulate files graphically by dragging the filename from one window (directory) to another. Workbench 2.0 has this same capability.

With one of these programs, it is extremely easy to see which files are already where. Who needs two copies of Prefs on their hard disk? Just because every program package assumes it will be the only thing you want on your hard disk, and therefore proceeds to copy every possible file and directory it may want, doesn't mean you have to put up with that nonsense!

A word of caution here: if you drag Filename into a partition, be sure to drag Filename.info along (if it exists), or no icon will appear later when you open the disk icon for that partition.

Most programs that install themselves onto a hard disk will create a directory (drawer) and put all of the files they think they'll need into this drawer. After they have done their thing, use your file utility to look at what's in that directory. If you see Prefs in there it's a pretty sure bet you can delete it with no problem. If you see subdirectories that seem to duplicate Workbench directories, open each one in turn as well as the corresponding directory in your main hard disk partition. Compare all of the files you see in each. If everything is duplicated, you can delete that subdirectory from the newly created directory and go on to the next. If the new one has some different files, the program you want to use will need these files and you should copy them into the appropriate directory in your Workbench partition.

After you've finished pruning the duplicate files from the directory, open the icon of the desired partition and drag the directory into it. Since you've copied the directory to a different device as far as DOS is concerned, the original will still be there in dh0:. Make sure no other icons are selected, then choose Discard from the Workbench menu to get rid of the unwanted directory in dh0:.

If you double click on the icon in its new home and you get a screen flash and error message, select the icon, then choose Info from the Workbench menu. Look at the line marked "Default Tool". If what you see there is a path designation, does it match the actual path? If not, change this line so the system isn't looking for the floppy the program used to reside on. Check the AmigaDOS manual for information on how to do this if you're not sure.

If the program still doesn't work correctly, try looking at the startup-sequence on the original disk. Often things other than getting the computer operating and running the program are done there. For instance, Balance of Power wouldn't run on my hard drive. I had to add a line to the startup-sequence to ASSIGN BOP to the proper partition and directory.

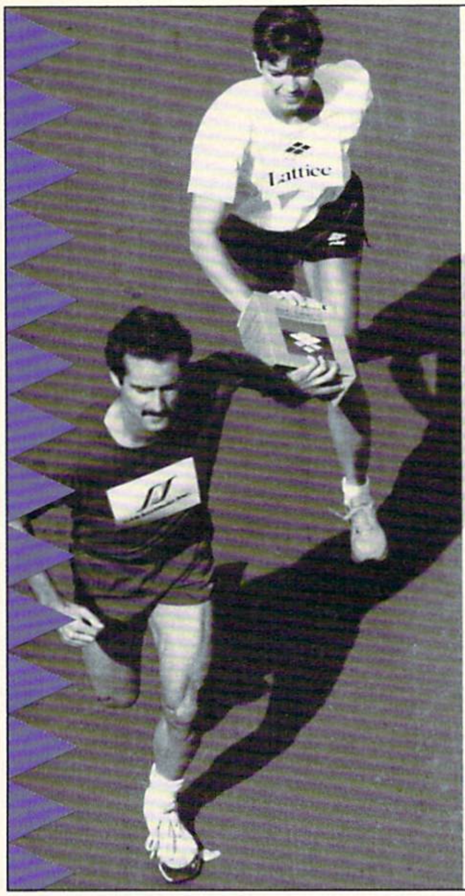
ONCE YOU'VE PUT ALL THE software you can beg or buy (don't steal it) on the hard disk, and everything is running smoothly, you can sit back and enjoy the fruits of your labors, right? Well, perhaps you can, but you're still not quite through.

Remember my earlier description of the heads on the hard disk? Want to guess what happens to something that's flying when you finally turn the power off and go to bed? Yes, they land, and while a problem may not arise, it's also not a good idea to let the heads just land randomly on the platter.

Some hard drives have a feature referred to as "autoparking", which means they move the heads to an unused portion of the platter before allowing them to settle. The formatting and setup software you got with the drive probably has a utility program to accomplish the same thing. This is an exception to the "Don't duplicate files" rule. Put a copy of this on every partition so that it's easily accessible, no matter which partition you're working in last. Then, definitely get in the habit of running this utility whenever you shut down. This will prevent any possibility of landing heads causing a media defect. It will also force you to wait long enough to assure AmigaDOS has written all of the disk buffers to the disk, eliminating the possibility of a trashed disk partition.

I know from experience that you can't be sure in advance how big to make each partition. When you've gotten everything established, you'll probably realize you didn't need such a large partition for one activity, while the games partition is already full!

At this point, the thing to do is write down all of the partition sizes, decide



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which ones you want larger, and which ones could be smaller. Then, back up the hard disk to floppies. Do a low-level format to completely erase the disk, repartition using the figures you decided on, and then high-level format the partitions. Now you can restore the programs from the floppies.

This again brings up the painful subject of backups. Painful because they take time, and if you fail to perform one and later have a problem, you have to redo all of the work you've done up to that point. Plus, you will have lost any files you downloaded directly to your hard disk, even assuming you still have all the others on floppies somewhere.

Backup programs are included with your hard drive controller software, and are available commercially. They come in two types: those that use standard AmigaDOS format on the floppies, and those that use a custom format. Each has its advantages and disadvantages.

Standard-format backups are available even if your hard drive suddenly transforms itself into a paperweight. You don't have to restore them to get at your files. The downside is it takes longer to do a backup in the first place, and it takes more blank floppies to do the job.

Custom-format backups cannot be directly accessed by AmigaDOS. They have to be restored first, like an Arced file you'd download. All of the files are there, but you have to do some processing to put them into a form that DOS can use. If the backup program allows it, you can restore the files to floppies. Custom-format programs will usually do the backup quicker and on fewer floppies.

NOW, REMEMBER WHEN WE checked the contents of different directories? Remember all those files that ended up in the c: directory for lack of a better place? Let's give them a better place. Following a semi-standard, make a subdirectory in c: called "Bin" (short for binary). Move everything that is not a standard AmigaDOS or ARP command, like your picture viewers, file readers, etc., into Bin. Then add the line:

```
Path dh0:c/Bin Add
```

to your startup-sequence. This will allow DOS to find the extra commands. By putting these less-frequently-needed commands into a separate subdirectory, DOS can find the commands it needs, most often much faster.

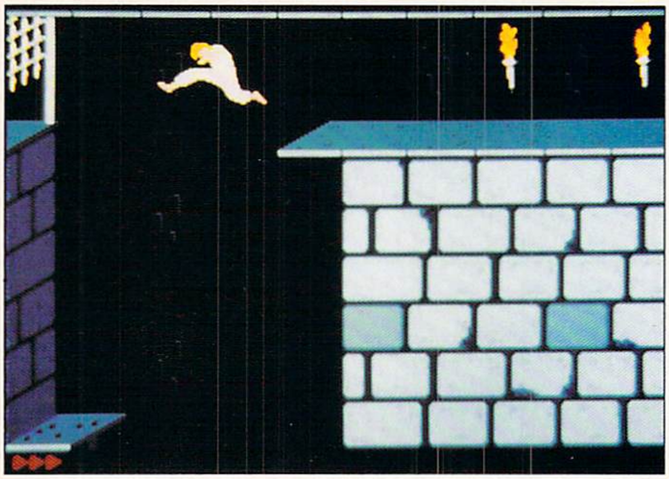
While you're at it, make another directory to hold all of the Read.Me and Doc files you've collected with the programs. A good name for this would be "Man" (short for manual). As you move files into this directory, change the names to reflect the file they refer to. Ever notice how many Read.Me files you have? A good procedure to follow is to rename all of the Doc files as "Filename.Man". Now you'll know which file this is for, and that this is the manual for the file, not the file itself.

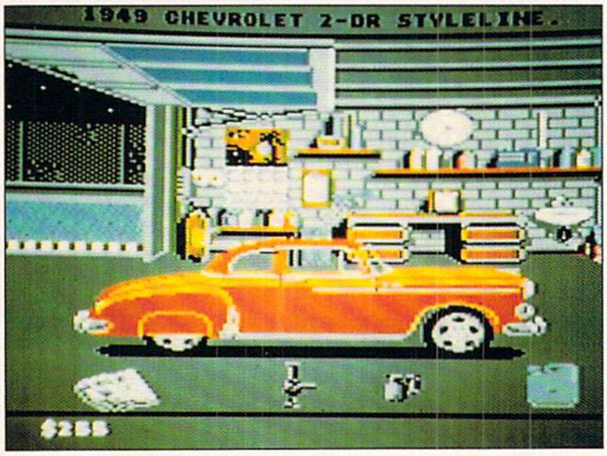
I hope these hints and tips will make your transition to the world of hard disks a little easier and more enjoyable. With a little thought and planning, it need not be traumatic.

•AC•

SNAPSHOT

by R. Bradley Andrews





top: Prince of Persia
bottom: Street Rod

PRINCE OF PERSIA

Prince of Persia from Broderbund is a running and jumping arcade-adventure platform game set in the Middle East many years ago. Some villain has taken over the kingdom and only you can eliminate him, free the land, and save the princess from a horrible marriage. Initially, I was turned off by the game because the controls were a bit difficult to work. But after talking to someone else who has had some experience playing it, I gave it another shot and was quite pleased.

You begin the game disarmed in the castle's dungeon. You must first find your sword and then fight your way up the castle tower through the game's many levels. The princess is being held at the top, and that is also where the villain is waiting for a final showdown. Guards are posted along the way to hinder your progress. Early on, they are relative pushovers, but as you make your way up, their skills get better and better.

Fortunately, most of the castle is uninhabited, and your success is mostly dependent upon your quick reflexes and timing. The first two levels are fairly easy, but from there on things get tricky. An untimely death takes you all the way back to the start of the game, so you have to fight through the same early sections just to get back to the point where the tricky maneuvering is required.

And, as the saying goes, your patience will (finally) be rewarded. While I did not make it to the end, I did have a good time. The graphics are simple, fit the theme, and look nice. Prince of Persia is worth playing if you are reasonably adept with a joystick and like a little strategy with your action.

STREET ROD

California Dreams seeks to recreate some of the muscle-car excitement of the 1960s in Street Rod.

As the game begins, classes have ended and summer recess has begun. You have decided to spend your vacation time pursuing the most important goal of all: winning the heart of Becky Sue. This can only be accomplished by out-racing everyone else in town.

You begin with a small amount of cash to invest in a clunker from the local newspaper's classifieds. After a bit of work, you are ready to actually hit the street and begin your racing summer.

Outfit and upgrade your cars in your own garage, then tool on over to Bob's Drive—the site of the real action.

Challenge the other hot rodders in your town to show you what they are made of. Do this by participating in either drag or road races. Drag races focus on acceleration and brute speed, while road races test overall car control. Races can be just for fun, for money (which you need to improve your vehicle), or for pink slips (where the winner gets to keep both cars).

For a racing game, the graphics in Street Rod are not bad. Just like in most games, you must begin at the bottom, going up against the lowest caliber speedsters first. Gradually work your way up, all the while raising enough money to buy your ultimate racing machine—and win the love of Becky Sue.

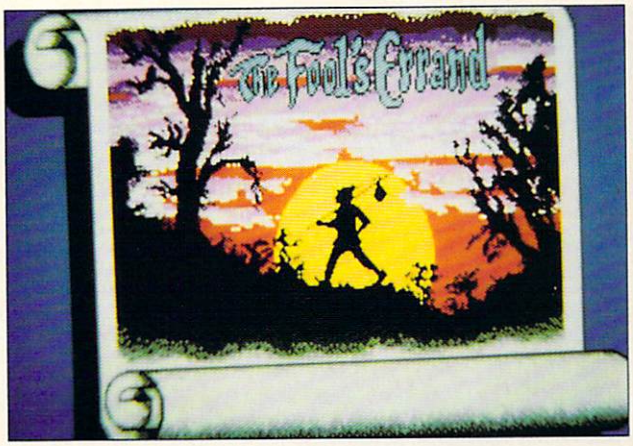
THE FOOL'S ERRAND

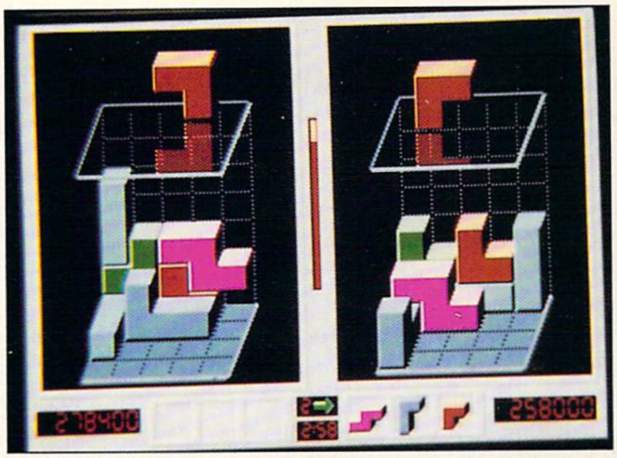
The Fool's Errand is in a category all its own. It is set in a far-off land that has been thoroughly "messed up" by evil forces. You are a naive traveler who must learn how to bring order back to the world. You do this by solving a whole series of puzzles, one for each of the different characters in the land. Only then can you restore the map of the world to its original state, while freeing its peoples.

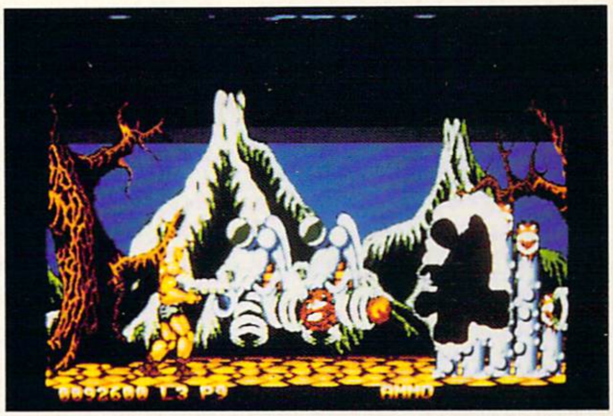
The different entities in the game appear to be characters from Tarot cards, while the puzzles themselves are very interesting and enjoyable. They range from moving puzzle tiles into the proper order to solving cryptograms that require moderate levels of manual dexterity.

All in all, it is a very challenging game, and big enough to take several evenings before the entire puzzle can be solved. No rules are provided for most of the puzzles, so you'd better wear your guessing shoes.

The graphics, conversely, are crisp and clear, and the story of the traveler is well-crafted and interesting to follow. The mouse is used for most control actions, except when the keyboard is used to enter letters. If you like word games, you are sure to enjoy this game.







top to bottom: The Fool's Errand, Blockalanche from The Future Classics Collection, The Plague

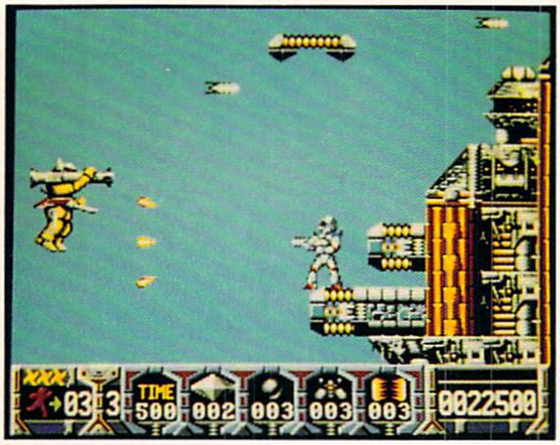
THE FUTURE CLASSICS COLLECTION

A new company, Live Studios, has released a group of five different games known together as The Future Classics Collection.

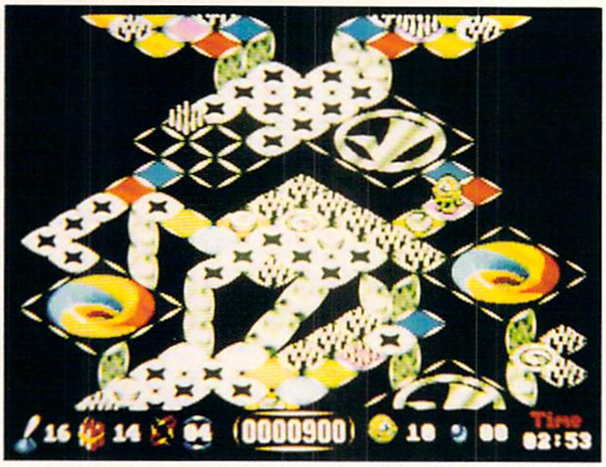
While each of the games is based on a hit game from the past, they are all unique in their own way, and thus provide an interesting challenge to players. In fact, Future Classics is really fourteen games in one, since four of the five games can be played in three different modes: solitaire, against a computer opponent, or against another human opponent. The other game can be played in either solitaire or two-player mode.

Two of the included games are based on the Pac-Man model: you run around gathering things up while avoiding the bad guys. First, in Diet Riot, you must gather up the supply crates of evil fast-food restaurants and throw them into the dumpster, thereby putting the stores out of business. But since they don't want this to happen, they have released hordes of fast food which force feed you to make you fat! Eating three pieces of junk food will kill your on-screen character, but several bench presses are available on each level to allow you to work off your excess weight. You must also be careful here, since working out too hard will also do you in.

The second game is Diskman, which is set in some weird computer-controlled world. Here, you must gather up the floppy disks from each level and insert them into the disk drive on that same level. Along the way, you also have to collect various color-



World of Turrican



Globulus

coded keys which help you get through locked doors. If there is time, you can also gather up some of the gems lying around to increase your score.

Of course, there are also "down" sides to Diskman. What would a computer game be without hazzards? No fun—that's what! In Diskman, nasty creatures with fatal touches patrol the levels. Plus, you must also move around rocks, and keep an eye out for bombs.

The third game in this series is entitled Lost 'N Maze. Here you must race against time and find the correct way out of different mazes. Each maze takes up an entire floor, and you must quickly find your way through the many paths and corridors to find the finish. Bonus points and several other useful items have been placed in cul-de-sacs along your way. These can help speed up your progress by showing you a temporary overhead view of the maze or by providing a visible arrow which shows the proper direction to the exit. Others effect your opponent by possibly stopping him in his tracks for a short time.

The fourth game, Tank Battle, is primarily based on tank combat games which have been popular since early computer gaming times. There are two variations to this game: solitaire and two-player mode. In the solitaire mode, the goal is to capture and return a flag that's located somewhere on the battlefield before your ammo and fuel run out. There are computer-controlled guns scattered about each level to hinder your progress, most of which must be destroyed to accomplish your mission. The two-player mode can be against either a human or computer opponent. Once again, the goal is to bring back the enemy flag, but instead of fixed guns, you now have an opposing tank to contend with. Destroying all of the enemy's tanks also brings victory in that level, as does depleting his ammo supply.

The final game in this group is called Blockalanche. Here, you must drop three-dimensional geometric pieces into a three-dimensional pit. Once pieces have been placed they cannot be moved, so placement and proper orientation are vital if you hope to effectively fill the required volume of each level. The size of each pit can range from the spacious four deep-by-ten wide, to the tiny two deep-by-four wide.

Either the keyboard or joystick can be used to control the action in any of these five games. The graphics are all well done, and the games include some interesting touches, although none of them are really new or truly innovative. But since you get five different games for the same price of many single games in the Amiga market, I think this is a very good value.

THE PLAGUE, WORLD OF TURRICAN & GLOBULUS

The Plague is one of three recent releases from Innerprise Software. It seems Man has pushed the frontiers of genetic research to the point of producing custom-designed humans. But a totally new plague has developed out of the experiments, and now, must go destroy everything to do with this genetic research project if the human race is to have any chance of survival.

The focus is on action: shoot anything that moves, and go as quickly through the levels as possible. Things happen extremely fast in The Plague and, as with most of this genre, the real keys to the game are quick reactions and the ability to memore what response is required in each area of the map.

World of Turrican is another new Innerprise release, and is both similar to and different than The Plague. The focus is still on action and quickly working to the goal, but this time your character is much smaller, and movement in all four screen directions is required to make it through each level. It's the best example of its own particular sub-genre of platform games for the Amiga. Both The Plague and Turrican have the usual power-up options along the way to increase your character's firepower, and the graphics are absolutely fabulous.

The animation is extremely smooth and seamless, and disk accesses are very minimal. The audio soundtrack and sound effects fit right into both games and either program could easily be used to show off what the Amiga is capable of doing.

Innerprise Software's other new release puts less strain on the reflexes, but requires a bit more thinking. Globulus is very similar to Clown-O-Rama from Starbyte, which I covered a few months back. You must find the proper route through many levels of an obstacle-strewn grid. Many different squares make up each level. Some, such as spiked squares, kill your character if he is foolish enough to step on them, while others propel your character through the air over intervening tiles. As usual, all moving creatures are hostile, and touching them kills your character. There are three tools to help in your task. "Flip" turns the screen vertically, changing the layout of the board as well and making new areas accessible. "Bombs" are used to eliminate particularly obnoxious obstacles and "smart bombs" destroy all creatures on the screen.

Each game begins with a limited number of tools, but more can be gained by either finding them on the map or by buying them at the end of each round with bonus points earned during that round. Once again, the graphics and scrolling are very sharp and enjoyable to watch. The key to many sections is precise timing, leading to many deaths in the trickier parts. Dying on a level makes you restart at the beginning of that level, and while the game does furnish a continue feature, it is only available to you every few levels.

Product Information

Prince of Persia
Price - $34.95
Broderbund Software
17 Paul Drive
San Rafael, CA 94903
(800) 521-6263
Inquiry #217

The Plague
Price - $39.95
Innerprise Software
128 Cockeysville Road
Hunt Valley, MD 21030
(301) 785-2266
Inquiry #220

Street Rod
Price - $39.95
California Dreams
dist. by Electronic Arts
1810 Gateway Drive
San Mateo, CA 94404
(800) 245-4525
Inquiry #218

World of Turrican
Price - $39.95
Innerprise Software
128 Cockeysville Road
Hunt Valley, MD 21030
(301) 785-2266
Inquiry #221

The Fool's Errand
Price - $49.95
Miles Computing
dist. by Electronic Arts
1810 Gateway Drive
San Mateo, CA 94404
(800) 245-4525
Inquiry #219

Globulus
Price - $29.95
Innerprise Software
128 Cockeysville Road
Hunt Valley, MD 21030
(301) 785-2266
Inquiry #222

Future Classics Collection
Price - $29.95
Live Studios
30151 Branding Iron Road
San Juan Capistrano, CA 92675
(714) 661-8337
Inquiry #223

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Shotgun Approach To Programming With AmigaBASIC

by Mike Morrison

YOU'RE AN INTELLIGENT PERSON. YOU HAVE A BA IN English, play the piano as a hobby, are a member of the PTA, and even drive a stick shift. Yet, you keep insisting that you could never program a computer. You don't even have a clue as to how a computer works. You just put the disk in and it seems to work. Well the problem might stem from a lack of effort or maybe just not having the proper training. This article, however, will attempt to bring the fundamentals about programming in AmigaBASIC out into the light, so we can get a foundation to build on. Remember the whole idea (as in life) is to have fun, so relax and try to concentrate on understanding the concepts which are really not that hard to comprehend. I will go step by step and try to give examples as we proceed through the jargon but you must be willing to learn and have an open frame of mind. Well, now that the introduction is over, let's get the ball rolling.

FUNDAMENTALS

Most programs can be broken down into three basic parts: 1) Input, 2) Process input, and 3) Output. A good example of this would be a word processor. You type in a letter (input); then you format it, move it around, spell check it, and add some fancy footers, (process); and finally print the letter on your printer (output). You'll find that other programs can be broken down in this manner.

UNDERSTANDING VARIABLES

Variables store the data when you want to change, print, or manipulate it in many different ways. I like to think of variables as mailboxes. An example of this would be writing a program to calculate a person's pay. We'll pretend you have your own company and that you are tired of calculating your employees paychecks each week. You'll need three variables or mailboxes to complete the task. The first mailbox will hold the RATE, the second mailbox will hold the HOURS, and the third will hold the actual PAY that will be calculated.

The mailboxes are ready for some mail (data). The RATE is 4.75 and the HOURS will be 75.

The next step is to calculate the PAY. This is a simple multiplication (RATE x HOURS = PAY). PAY would then have 356.25 in it.

Variables are nothing but "space" in the computer's memory with names associated to them. This allows us to give variables names that make sense. So we call the rate variable RATE. We could have called it anything we wanted, but using meaningful variables will help solve problems with your programs.

The above example in actual AmigaBASIC would be:

```
rate=4.75
hours=75
pay=rate * hours
PRINT pay
```

If you want to try this program double-click on the AmigaBASIC (AB) icon. AB always starts out with two windows. One is the Output window (the one on the left), and the other is the Listing window (the one on the right). Click the mouse pointer into the Listing window. A red/orange cursor will appear (the AB cursor is a vertical line. It shows where text will be put if you type on the keyboard). Type in the above code, hitting the return key after each line.

When you have the example typed in click, in the output window with the mouse pointer. Type RUN and press the return key. RUN is an AB command that tells the computer to execute the program in the Listing window. 356.25 should appear in the Output window. Congratulations, you have just written your first AB program.

OTHER VARIABLES

There are several different types of variables. The ones that we have used thus far are for numbers but there are also variables for characters. The example for this will use a character variable called WORD$. Notice that character variables have a $ suffixed

(even if you can't spell BASIC)

to them. This is how AB knows that it is dealing with characters and not numbers. The value 'How about that.' will be put into the variable called WORD$. Then we will use the AB command PRINT to show what is in the variable WORD$. The code looks like this:

```
word$='How about that.'

PRINT word$
```

Once you have typed this into the Listing window you can type RUN into the Output window. You will see in the Output window:

```
How about that.
```

Most programs can be broken down into three basic parts: 1) Input, 2) Process input, and 3) Output.

CLARIFICATION

AB will capitalize all AB commands once you save a program and load it back in or close and open the Listing window.

SAVING AND LOADING

If you spend a lot of time typing in a program you may want to save it to disk. Type SAVE myprogramname in the Output window. Your program will be saved to the floppy that AB is on. This may not be the best place for your programs. I suggest that you format a blank disk and name it something like BASIC_PROGS (you will have to leave AB to do this. See your owners manual for more information on how to format a disk). Then you would type SAVE "BASIC_PROGS:myprogramname" in the Output window. This will save myprogramname onto your BASIC_PROGS disk. Even if you have a one drive system or don't have the diskette in a disk drive the system would ask you to "Please insert BASIC_PROGS into any drive."

When you want to RUN this program at another time type LOAD "BASIC_PROGS:myprogramname" in the Output window. After a few seconds, your program will appear in the Listing window. Then just type RUN.

The AB commands SAVE, LOAD, and RUN can be executed by selecting them from the pull-down menus when you are in AB. Hold down the right mouse button and look through the menus. Notice that there are many different options available. Selecting RUN from the menu is the same as typing RUN and pressing the return key in the Output window. So is holding down the right-Amiga key (the one to the right of the spacebar) and pressing the R key. There are many different ways to accomplish the same thing. After a while you'll develop a preference.

LAST EXAMPLE

I want to give one more example to help clarify variables. Type in the following program and save it if you wish. I have not covered the INPUT and PRINT commands yet, but I will at a later time. For now type them in as they appear.

Run the program and observe the results. Run it several times using different data and look how the variables keep track of the information. The idea here is to understand variables.

```
INPUT "What is your name";yourname$
INPUT "What is your hourly rate";rate
INPUT "How many hours did you work";hours
pay=rate * hours
PRINT "You worked "hours" at $"rate" per hour,"yourname$
PRINT "Your pay is $"pay
```

I hope that this article helped you understand variables a little bit better. The more practice you can get working with them the easier it will be.

•AC•

AC Exclusive:

"TWIN PEEKS" AMIGA SHOW REPORT

ONE WEEKEND. TWO SHOWS. What s a magazine to do? October 5-7, 1990 saw the simultaneous occurance (some might say clash) of two Amiga shows. Having housed over 60 exhibitors and approximately 7000 attendees during the three-day event, AmiEXPO in Anaheim, CA might have seemed to some the heavyweight. World of Amiga, held just outside of Chicago, IL, had considerably fewer exhibitors—a total of 24—and a fraction of the number of AmiEXPO attendees. Still, a no less earnest effort came underway there. Thankfully, unlike many, we had the chance to attend both.

ANAHEIM

AT AMIEXPO, ANAHEIM, **Applied Engineering** displayed the AE Send-Fax option for AE's Datalink modems. With Send-Fax, an Amiga can now be used to fax messages containing text and graphics to any Group 3 fax machine. AE stated that they plan to announce receiver-fax capability options in the near future.

A new 2-D multi-curve plotting package, APLOT2D, became the first release of a brand new company, **Amiga Tech Scientific Applications.** APLOT2D is a complete scientific and two-dimensional color data plotting package with over 20 features including on-line help, PAL compatibility, automatic plot type and scale formatting, and more. APLOT2D is available directly through Amiga Tech for $79.95.

In a diner-style booth **California Access** served up their first entries into the Amiga hardware market. These include Bodega Bay ($349.95), an expansion console for the A500 with four 100-pin A2000-compatible card slots, Rodeo Drive (price unavailable), a 3.5-inch external floppy that's only .75-inches tall, and the Malibu Board ($229.95) a SCSI controller designed to hold a 3.5-inch hard card equipped with a slot for the company's Catalina Card ($99.95), a 2MB to 8MB expansion card.

MegageM released three new products: CellPro, NeuroPro, and BarPro. CellPro ($89.95) is a "Cellular Automata Art and Animation System" with built-in programmable CAs and a designer mode to create your own CAs . NeuroPro ($89.95) is a Neural Network artificial intelligence system for development of intelligent applications. NeuroPro supports a 3-layer back propagation network architecture with up to 192 network elements. BarPro is an industrial-quality RS-232 serial bar code wand reader and software. It will read and print bar code labels with UPC support (software only: $89.95).

Jim Bayless of **New Horizons Software** announced a new drawing package, Graphic Designer. Graphic Designer is a structured drawing program for people who require a detailed, precise drawing package without using a CAD program. The structured drawing technique allows users to work with objects that can be modified. Carrying with it the promise of ARexx support, Graphic Designer should be available the first quarter of 1991 for $125.00.

By the looks of their new Jim Sachs calendar ($9.95), **OXXI/Aegis** appears eager to strike 1991 with as much fervor as they did 1990. In keeping with this zealous spirit was the company's announcement of Aegis SpectraColor as the first HAM paint program for the Amiga to support full Brush Animation and Key Frame Animation. With programming features, 4096 colors, and special paint techniques, Aegis SpectraColor promises to be a very worthy package. The package is due out by the end of this year (price for the product was unavailable).

The Aegis AudioMaster III ($99.95) digital sampling and editing software was released. Its features include interactive visual waveform editing, zoom mode, multi-loop sequencing, and more. And TurboText, OXXI's new text editor promised by OXXI representatives to be fast, powerful, and extremely flexible, will be available by the end of 1990.

From tools to pool, OXXI rounded out their announcements with a new piece of entertainment software, Fast Eddie's Pool and Billiards Parlor, a collection of 14 computer simulated billiard games for the Amiga.

A NEW AMIGA DEVELOPER from Queue, Inc., **Pelican,** introduced their first program for the Amiga—a highly colorful "lighthearted" publishing package called Pelican Press ($99.95). This package is perfect for the adventurous adult or serious child. The art and graphics tools allow users to mix text and graphics in any creative combination. Banners, calendars, invitations, and even Fax messages can now be a little brighter with the witty characters that have been included. There are different packages for home and/or school use.

Progressive Peripherals & Software introduced their newest tool for the Amiga, Video Blender, a video switching system featuring video switching, luma-keying, genlocking, 16 million color generation, video fading and wiping, and stereo audio mixing. It sports a composite video with pass-through, external synchronized NTSC RGB in, Amiga RGB in, and an internal 16 million color generator. With more features than we have room for here, the Video Blender appears to be the solution to a lot of video needs. Video Blender is due by the end of 1990, with a price of $1295.00.

In the same arena, Progressive introduced VideoMaster 32, a 32-bit dual frame buffer board with 24-bit painting and 24-bit digitizing capabilities. VideoMaster 32 comes with VideoCanvas 24, a real-time 16 million color paint system. Both products are scheduled for release the first quarter of 1991 (no price was available).

Progressive also announced their own accelerator card, the Progressive 040-DC, a 68040 with data compression ability for all Amiga 3000s. The 040-DC will retail for $1295.00 ($995.00 without data compression). Progressive has also neared completion of their AppleTalk network, DoubleTalk, due by the end of this year.

VidTech International announced VideoMaster, a new broadcast-quality multimedia genlock for the Amiga. VideoMaster includes special effects and other features at a suggested retail price of $1295.00. The external system is available in both PAL and NTSC models.

JIM GOODNOW INTRODUCED his new company, **Zardoz.** Goodnow was central in the developement of the Manx C compiler and he has used his experience to produce a series of Amiga utility programs. Zardoz's ImageFinder ($65.00), it appears, will be a tremendous asset to anyone who must deal with a variety of graphic formats or a multitude of graphics.

ImageFinder consists of two parts, the image analyzer and the index browser. The image analyzer will scan one or more volumes on a disk to analyze any image files discovered. This analysis is then added to the index file with a reduced version of the image. The image analyzer can be activated automatically whenever a new image file is created. The index browser is a background process that can be accessed at any time by a hot-key combination. The browser displays a screen with the miniature images created by the image analyzer.

With ImageFinder, images can be scrolled through and examined. If an image is selected, its file directory and name can be automatically inserted into the file requester of an application. An index can be sorted, defined, and reduced by specific criteria.

CSA (Computer System Associates) demonstrated their 33MHz 030 accelerator for the A500, A1000, and A2000 under the name Mega-Midget Racer. They also displayed their 8MB, 32-bit memory expansion board, Mega-Memory, which will expand to 19MB of memory (10MB of which can be 32-bit wide).

LOOK OUT NeXT—X WINDOWS for the Amiga is here! **GfxBase**, headed by Dale Luck of original Amiga fame, has announced the release of X Window System Version 11 Release 3 (X11) for the Amiga (Release 3.1D). X11 for the Amiga is an implementation of X11 from the MIT X Window Consortium. The X Windows philosophy is to provide a network-transparent and operating-system-independent environment for running applications (clients). X Windows is an international standard (and still growing), and is supported on nearly every workstation platform.

The X Window System is based on client/server technology, meaning applications can be used on the user's computer, while actually executing on a remote host computer via Ethernet or serial connection. DECnet capability is available using TSSnet from Syndesis.

X11 for the Amiga can run on any Amiga with at least 1MB RAM and 7 MB hard disk space (14 MB hard disk space is required for complete system, and extra RAM is needed to run local clients). As for OS compatibility, the X11 System coexists with AmigaDOS 1.3 and later, and works under Intuition.

GfxBase also released the X Window System Programmer's Toolkit for the Amiga (Release 4.0C). The Toolkit provides programmers with the tools necessary to develop applications that take advantage of X11 for the Amiga. The Toolkit consists of the MIT Xlib interface libraries, including the higher level MIT Xt intrinsic library, adapted to compile under the Lattice 5.0 C Compiler for the Amiga. The Toolkit provides the libraries, includes, and sample source code needed to get on the X11 programming wagon. With this library and some good design and imagination, some really cool things can be done. This could be the gadget to break the Amiga 3000 into the workstation arena. *GfxBase, 1881 Ellwell Dr., Milpitas, CA 95035, (408) 262-1469. Inquiry #311*

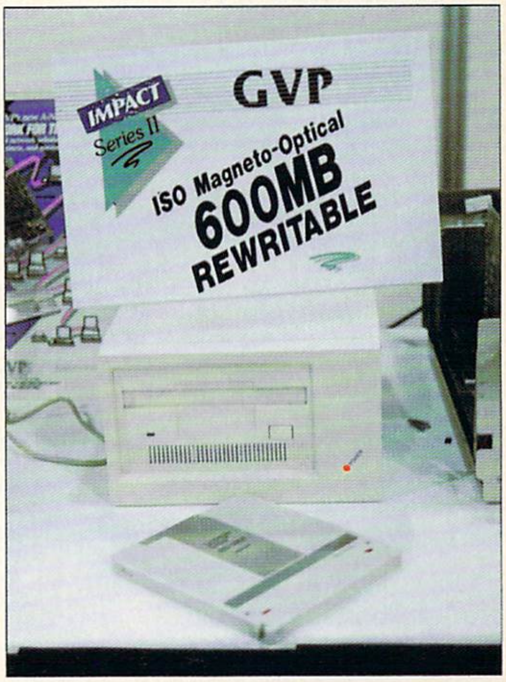
Digital Creations once again displayed their video display and digitizing system, DCTV—this time with the assistance of DCTV Paint, a new 24-bit paint program designed for use with DCTV.

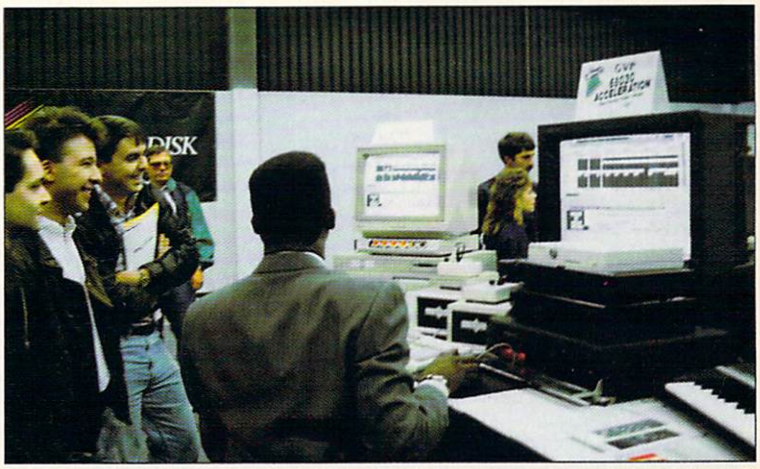
Memory And Storage Technology (M.A.S.T.) demonstrated Blitz Basic, as well as their newest special item, ColorBurst. According to a M.A.S.T. representative, the ColorBurst unit supplies true 24-bit color through a small unit that plugs into the Amiga's RGB port. The unit will sell for $495.00, but has yet to receive FCC approval. Also demonstrated at the M.A.S.T booth was the Colortease 256 color module that also plugs into the RGB port and will let your Amiga display 256 colors at once out of a palette of 16.8 million. To be priced at $195.00, Colortease also has yet to receive final FCC approval.

ICD, INC. ANNOUNCED Flicker Free Video as the first flicker-free video card to work with A500, A1000, or A2000 computers. Flicker Free Video ($499.95) does not occupy the video slot on the A2000 and is designed to work with VGA or multi-frequency monitors. ICD also announced AdSpeed, an accelerator for any 68000-based Amiga. AdSpeed ($349.95) replaces your current 68000 CPU to create a 14.3 MHz 68000 accelerator. The speed is also software-controllable between the 14.3 MHz and a true 7.16 MHz mode for 100% compatibility.

Trumpcard Professional ($279.00) received a major upgrade in the form of SCSI Share. A new feature of the **IVS (Interactive Video Systems)** controller, SCSI Share allows up to 7 A500, A2000, or A3000 computers to share one or more SCSI hard drives. New Trumpcard utilities allow partitions to be read and write-protected for controlled access to the drive. SCSI Share has been tested with up to 80 feet of cable.

Konyo International blasted onto the Amiga scene with no less than eight products for the Amiga (including two different types of Amiga mouses). Konyo's RC2000 is a 2 to 8 MB RAM board for the A2000. Suggested retail for the board starts at $249.00. For Amiga 500 owners, Konyo has produced the RC500 512K memory card with real-time clock ($89.00). Konyo has developed a standard floppy drive for the Amiga called the Master 3A-1 ($169.00). A second drive under their **GoldenIMAGE** logo which includes an LED readout of the track position is the Master 3A-1D ($189.00).





top right: GVP's new 600MB Magneto-Optical Drive. right: WOA attendees were eager for a glimpse of Gold Disk's Showmaker.

Konyo's GoldenIMAGE JS-105-1M is a 100, 200, 300, 400-dot-per-inch selectable hand scanner with three different halftone modes, 64 halftone levels, and a letter mode. The package comes complete with touch-up software and is only $299.00. There is an optical bus mouse (GI-1000 at $119.00 and the GI-500 at $69.00) which uses a Lens & Led configuration with no moving parts and an optical pad. The GoldenIMAGE logo is also on the GI-500C ($69.00), which is an optical mechanical replacement mouse for the Amiga.

Golem Computer is a American company from German hardware developers, **Kupke**. Golem first demonstrated their product line at the AmiEXPO '90 in Chicago; their involvement in the American market has definitely increased since that time. Golem is offering a series of SCSI hard drives, floppy drives, RAM expansions, a sound digitizer, and a light gun device. For the A500 user, Golem has a SCSI II hard drive with 16-bit SCSI Interface, RAM expansion up to 4 MB, Kickstart 2.0 option, pass-through Amiga bus and SCSI connections, and a transfer rate of 1.4 MB/sec. Golem's floppy drives include quiet operation, LED track display, and a pass-through connector. The 8 Meg RAM Expansion has a Zero Wait state, 100% asynchronous bus timing and is compatible with 68010, 68020, and 68030. The Sound Mashine is a stereo sound digitizer with up to 56 KHz sampling-rate, LED mute control, and sampler software. The SCSI II Filecard works in the Amiga 2000 providing a 16-bit SCSI interface, a DMA-free data transfer, a transfer rate up to 1.4MB/sec, an external SCSI connector, and an autoboot, FastFileSystem. All of the above products are manufactured in Golem's German facilities.

IN OTHER AMIEXPO NEWS, **SAS Institute** was on hand to demonstrate the flexibility and new features of their SAS/C Compiler Version

5.10, an upgrade to the Lattice C Compiler Version 5.x. **SunRize Industries** announced a "near completion" on their "Audio for Video Post Production." **NewTek** did not exhibit, but Alan Hastings did give a talk on the Video Toaster and reports were made that the Toaster was shipping (these reports have been verified, the Toaster is in the hands of several developers).

In the back of the exhibit hall, AmiEXPO designated an entertainment area called the AmiEXPO Amiga Arcade. Here **Avatar Consulting, Broderbund Software, Cinemaware, Hemisphere, Karmasoft, MicroProse, Spectrum Holobyte,** and **Virgin Masteronic** displayed the newest games and simulations for the Amiga.

CHICAGO

ALTHOUGH **COMMODORE** DID not introduce any new items at World of Amiga, the spiffy new CBM booth, positioned right smack at the front of the show floor, was a must-visit for the majority of attendees. Although CDTV will reportedly not be available until the beginning of next year, Commodore reps sought to provide showgoers with information pertaining to the Amiga's use in music, multimedia, and business. CBM President Harold Copperman, in his keynote address, projected an image of Commodore as a company focused on change. In the impromptu speech and Q & A session which replaced his staff-written speech (in light of the small audience), Copperman revealed elements of a "five-point plan" which would focus on, among other things, enhancing the company's image, addressing distribution and customer satisfaction problems, and mastering new markets—mainly those of education and government. In the way of advertising—an area in which Commodore has been sharply criticized—Copperman promised "something different this Christmas."

Attracting all would-be videographers were demonstrations of **Gold Disk**'s Showmaker, the desktop video program that will reportedly allow even the most novice video enthusiast to combine live video, animation, graphics, music, and titling to produce professional-quality videos. Among its features, Showmaker will provide animation playback synchronized to music in frames-per-beat, background music looping for easy creation of sampled soundtracks, complete control over genlock functions, MIDI sound effect support, and the ability to run Showmaker productions from Commodore's AmigaVision. Price for the package will be $395.00; a release date has not been announced. Other new Gold Disk programs include the recently released Gold Disk Office *[see "New Products", page 14]* and Professional Draw 2.0 ($199.95), as well as the soon-to-be-released Professional Page 2.0.

Xetec's latest was served up on a silver platter in the form of the company's new CD-ROM drive systems. Talk about volume savings! Xetec's CDx-650 SCSI drive systems provide access to vast amounts of information with removable, non-volatile CD-ROM discs boasting capacities to 650 meg—equivalent to 750 floppies(!). The CD-ROM drive systems are available in two models—the external, self-contained CDx-650e ($699.00) with built-in power supply and dual SCSI connectors for daisy-chaining, and the internal CDx-650i ($599.00). The systems use industry-standard ISO 9660/High Sierra disks (the same format used in Commodore's CDTV). Xetec is currently offering, free with the purchase of either system, their Fish & More Vol. 1 CD-ROM that includes the Fred Fish library (up to #370) as well as additional public domain software for a total of over 400 megabytes of data. Of course, Fred Fish and CDTV aside, you can always toss your favorite Elvis Costello CD into the drive for a veritable swingin' time.

Garnering a good deal of the attention at **Great Valley Products**' booth was the company's new SII-MO9200E/600-Ricoh 600MB Magneto-Optical Drive. The drive features 600MB formatted capacity per cartridge (300 MB per side), ISO format compatibility, state-of-the-art Magneto-Optical technology that enables cartridges to be over-written many times, and 66.7 ms average access time. The new drive lists for $4299.00; each additional cartridge lists for $349.00.

Lake Forest Logic introduced Macro Paint, a new graphics package that takes advantage of the Amiga's graphics co-processor to allow users to draw with all 4096 colors in the Amiga's high-resolution graphics mode, thereby providing users with a screaming array of colors without sacrificing resolution. Macro Paint ($139.95) records the true 12-bit color of each pixel in fast memory and is able to read and modify 32, 64, and 4096 color pictures once limited to low resolution. Users can read in standard 24-bit scanned or digitized IFF images and convert them to Macro Paint's 12-bit high-resolution format. And ARexx compatibility, you ask? The Lake Forest Logic package fully supports ARexx and is able to receive commands from an external ARexx program as well as launch user-created macro programs from within.

For the business user, **Precision Software** promoted their line of productivity tools including the Superbase Professional V3.0x ($349.95) designed for form design, application development, and relational database management systems. Version 4.0 of Superbase Professional will reportedly be released in January with a price of $499.95.

above: Commodore's booth was the first stop for many at the WOA show.
right: The "Away Team" from Moebius Computer Systems, Ltd. in Victoria, B.C. (left to right: Ewan Edwards, Brad DuTemple, Mike Biddlecomb, and Will Murphy) break for a literary interlude at AmiEXPO.

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Free Spirit Software exhibited the "Barney Bear" educational series, including the two most recent additions, Barney Bear Goes To Space ($34.95) and Barney Bear Meets Santa Claus ($34.95) *[see "New Products", page 17]*. Does this Grizzly get around, or what? Also new at the Free Spirit booth was Sterling Service BBS ($149.95), a bulletin board system equipped with an intuitive, graphically-oriented interface that allows users to create up to six BBS clubs with up to eight sections each, and provides ANSI and ANSI extended color graphics for on-line menus and help text, Sysop remote CLI access, and an optional on-line screen editor.

Making the trek all the way from the U.K. was a relatively new face on the Amiga market. Representing **Database Educational Software** and **Mandarin Software**, Christopher Payne introduced to show attendees the Fun School 3 series of educational programs available in three levels: for children under 5 years of age, for those between the ages of 5 and 7, and for those over the age of 7. The programs are designed to develop skills in a number of areas including spelling, grammar, and numbers.

THERE WAS NO SHORTAGE OF amusement for game devotees at WOA as developers unveiled their latest in strategy, sports, and sci-fi. At **Data East**'s booth, attendees got a glimpse of the second title in the company's "Draconian" series, Chamber Of The Sci-Mutant Priestess. ($49.95). With telepaths, mutants, and a damsel in distress, this game has something for everyone. Other new releases from Data East include Full Metal Planet ($49.95), and ABC's Monday Night Football ($49.95), a simulation that reportedly has everything but the bonding and beer commercials built in.

For an equally challenging, though perhaps more refined approach, **Merit Software** had news of their latest release, Classic Board Games ($39.95). Depending on the amount of starch in their collars on any given day, players can choose from a game of chess, backgammon, or checkers.

Broderbund's Carmen Sandiego, having travelled to just about every conceivable location, has now taken to time travel. In the latest installment of the company's popular "Carmen Sandiego" series, Where In Time Is Carmen Sandiego? ($49.95), everyone's favorite looting lady and her cohorts have gained access to a time machine and are threatening to do damage in the Middle Ages, the Renaissance, the Industrial Revolution, and the Modern Age.

Some of the more recent releases from **MicroProse** included Red Storm Rising ($54.95) and Midwinter ($39.95) *[see review page 56 of this issue]*.

New releases from **Sierra** place the player on an underwater mission to a hostile Middle-East nation in the year 2000 in Codename: ICEMAN ($59.95), at a decrepit plantation in 1926 to unravel a murder mystery in The Colonel's Bequest ($59.95), or in a whirlwind of chivalry and round tables in Conquests Of Camelot ($59.95). And in the third installment of the "Leisure Suit Larry" adventures, Leisure Suit Larry III: In Pursuit Of Passionate Patti ($59.95), players are treated to a bit of role reversal. As Larry pursues Patti, players can choose between the perspective of the pursuer or the pursuee.

New titles were in abundance at the **Accolade** booth, including Gunboat ($49.95), Jack Nicklaus ($29.95) and Altered Destiny ($59.95). Also on the new release list is the strategy game Ishido ($54.95), and Search For The King ($59.95) which sends the player on a hunt for America's favorite bloated rock 'n' roll icon. The **Actionware** booth was busy as children and adults alike exorcised latent violent tendencies via the company's Light Phaser Gun, designed for use with Actionware's Capone, P.O.W., and Creature releases.

For folks who wanted a bit more realism in their exercises in aggressive behavior there was Mad Dog McCree, **TTR Development**'s live video laser game in which players take aim at videotaped images of actors in an ol' West scenario. Currently in a few test areas, the game (which runs on a 500 hooked up to a laser disc system) is slated for full-fledged arcade release in the next few months. TTR also exhibited their Sapphire 68020/68881 accelerator board ($399.00), as well as MRBackup Professional ($54.95), a fully featured hard drive backup program with built-in tape capability. •AC•

A list of exhibitors from both shows follows.

World of Amiga '90 Chicago, IL

Abacus
5370 52nd Street S.E.
Grand Rapids, MI 49512
(616) 698-0330
Inquiry #287

Accolade
550 S. Winchester Blvd.
San Jose, CA 95128
(408) 985-1700
Inquiry #288

Actionware
38 W 255 Deerpath Road
Batavia, IL 60510
(312) 879-8998
Inquiry #289

American Software Distributors
R.R. #1 Box 290 Bldg #3
Urbana, IL 61801
(217) 643-2050
Inquiry #290

Broderbund Software
2888 Bluff, #546
Boulder, CO 80301
(303) 499-3266
Inquiry #291

California Freeware
1747 E. Ave. Q
Palmdale, CA 93550
(805) 273-0300
Inquiry #292

Commodore Business Machines, Inc.
1200 Wilson Drive
West Chester, PA 19390
(215) 431-9263
Inquiry #293

Data East USA
1850 Little Orchard Drive
San Jose, CA 95125
(408) 286-7074
Inquiry #295

Database Software
Europa House, Adlington Park
Adlington, Macclesfield
Cheshire, England SK116EW
(01144) (625) 859 444
Inquiry #287

Disks & Labels To Go, Inc.
Rt. 206
Eastampton Business Park
Mt. Holly, NJ 08060
(609) 265-1500
Inquiry #296

Free Spirit Software
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Kutztown, PA 19530
(215) 683-5609
Inquiry #297

Gold Disk
2175 Dunwin Drive, #6
Mississauga, Ontario
Canada L5L 1X2
(416) 828-0913
Inquiry #298

Great Valley Products
225 Plank Ave.
Paoli, PA 19301
(215) 889-9411
Inquiry #299

Lake Forest Logic
28101 E. Ballard Road
Lake Forest, IL 60045
(708) 680-0832
Inquiry #300

Merit Software
13635 Gamma Road
Dallas, TX 75244
(214) 385-2353
Inquiry #301

MicroEd Enterprises
444 N. Orleans, Suite #250
Chicago, IL 60610
(312) 245-0066
Inquiry #302

MicroProse
180 Lake Front Drive
Hunt Valley, MD 21030
(301) 771-1151
Inquiry #303

Migraph, Inc.
200 S. 333rd Street, Suite 220
Federal Way, WA 98003
(206) 838-4677
Inquiry #304

Precision Incorporated
8404 Sterling Street
Irving, TX 75063
(214) 929-4888
Inquiry #305

Ring Software
726 E. State Street
Geneva, IL 60134
(708) 232-0009
Inquiry #306

Sierra On-Line, Inc.
P.O. Box 485
Coarsegold, CA 93644
(209) 683-3472
Inquiry #307

TTR Development
1120 Gammon Lane
Madison, WI 53719
(608) 277-8071
Inquiry #308

Walt Disney Computer Software, Inc.
500 S. Buena Vista
Burbank, CA 91521
(818) 567-5360
Inquiry #309

Xetec
2804 Arnold Road
Salina, KA 67401
(913) 827-0685
Inquiry #310

AmiEXPO '90 Anaheim, CA

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Chicago, IL 60606
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Amiga User Group of Long Beach
5115 Via Veranada
Long Beach, CA 90805-6525
(213) 422-8226
Inquiry #229

Amiga Video Graphics Guild
1649 Arcane
Simi Valley, CA 93065
(805) 584-0863
Inquiry #230

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Inquiry #231

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Inquiry #237

California Access
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Los Gatos, CA 95030
(408) 378-0347
Inquiry #238

California Shareware
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Suite 422C
Quartz Hills, CA 93536
(805) 273-0550
Inquiry #239

Centaur Software
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Inquiry #245

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Inquiry #248

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(415) 656-2890
Inquiry #249

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20675 South Western Avenue,
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Inquiry #278

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1133 Commercial Way
Albany, OR 97321
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Inquiry #280

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Grants Pass, OR 97526
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San Luis Obispo, CA 93401
(805) 545-8515
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upgrades • fixes • updates • new releases

bug bytes

by John Steiner

A NUMBER OF UPGRADES HAVE RECENTLY become available. Workbench 2.0 for the Amiga 3000 was upgraded to Workbench 2.01 with the shipment of new 2.01 Kickstart diskettes to A3000 dealers in September. A letter accompanying the diskette advised dealers that their A3000 customers can upgrade their Kickstart at no charge (other than a nominal fee for a diskette if customers do not supply their own).

The new Kickstart seems to be much more stable than the previous version, though it appears there are still a few bugs remaining. Many programs that did not run properly under 2.0 now seem to operate correctly. This version appears to be so stable that the final release version might not be far away. However, I have been told by a reliable source that beta testers are now using Kickstart 2.02, and even that version still has a few problems. So, you won't be hearing any predictions from me about a final release date for Workbench 2.0 at this point.

ONE PROGRAM THAT I ORIGINALLY expected to work with Workbench 2.0 was AmigaVision, the multimedia authoring system designed by Commodore. So, I was surprised to encounter several problems with the program when used under Workbench 2.0. The latest version Kickstart 2.01 did fix a couple of problems that affected AmigaVision's Database functions. The one conspicuous bug remaining involves the incorrect display of overscanned images. When running an AmigaVision flow that uses overscanned images, Workbench 2.0 (or maybe AmigaVision) consistently fails to display overscanned areas of the screen. This happens whether or not there are any buttons located in the overscanned areas. I discovered this problem when I designed an interactive application on my A2000 that used overscanned images. When played under Workbench 2.0 on the A3000, I couldn't get at the "Continue" button, which was not in the visible screen display area. Even the new Workbench 2.01 exhibits this overscanned image problem.

In late September, authorized AmigaVision dealers received new versions of the authoring system. The new program disk is identified with a sticker that reads in part "V1.53G". This latest version came with a letter announcing several improvements, the major one being that the program operates much more reliably under Workbench 2.0, and a couple of items were corrected. The so-called Runtime options have been relabeled as Create Diskettes and Install/ Relocate. This is not exactly fixing a bug; it's more like renaming the operation correctly. Runtime implies that the application is "stand-alone" and doesn't require that the AmigaVision program itself be available. But AmigaVision must be available to the system on which the application is running, so there has never really been a Runtime capability built into AmigaVision. By naming the menu choice "Create Diskettes", Commodore has at least eliminated this inconsistency of terms.

The one irritating source of problems that has been improved on is the Install function. Formerly, troubles arose with Install during relocation of an AmigaVision flow of information from multiple floppy disks onto a hard disk. The earlier version requested diskettes in a seemingly haphazard manner, forcing the end user to make many unnecessary disk swaps. As you might imagine, this was especially difficult on systems with only one floppy drive. This problem has been eliminated by reorganizing the order of files written to floppy. Now, each diskette is accessed only twice in the process. A single-disk access would have been better still.

You can identify from within the program which version you have by choosing "About" from the Project menu. The latest version's requester states "AmigaVision Version 1.53 Revision G". If you did not receive an upgrade directly from Commodore, contact the dealer from

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whom you purchased AmigaVision. Bring your original AmigaVision diskettes down to him, and he will upgrade them for your system. *Contact: Commodore Business Machines, Inc., 1200 Wilson Drive, West Chester, PA 19380 (215) 431-9100. Inquiry #200.*

MICROILLUSIONS HAS ANNOUNCED A version 1.1 upgrade to Music-X, their MIDI sequencer for the Amiga. New features of the program include the ability to communicate with up to 8 serial ports in both directions simultaneously, for a total of 128 MIDI channels. Other new features mentioned in the notice are event sculpting, the ability to view one or all controllers, and a velocity flattener module. In addition to these changes, they have also made several performance enhancements. To receive the upgrade, send your original Music-X program, utilities disk, and $25.00 to the company offices. *Contact: Microillusions, P.O. Box 3475, Granada Hills, CA 91394, (818) 785-7345. Inquiry #201.*

UNTIL ABOUT TWO MONTHS AGO, I had been using PD or shareware terminal software to communicate with others on People Link and CompuServe. I had not been impressed with what was available in commercial terminal software, since what I was using only cost downloading time and a small shareware fee. Once I'd taken a look at Baud Bandit from Progressive Peripherals, I bought my first commercial terminal program. It's very full featured, and has an ARexx port for external control should you desire to operate the software from within another application. Baud Bandit multitasks very nicely, allowing me to work on my other projects while downloading. The program even pops its screen to the front when the download is complete so you don't waste on-line time, should you happen to forget you are downloading.

I mention this program here because an upgrade from version 1.0 to version 1.5 is now available. Registered owners of Baud Bandit 1.00 who desire the upgrade should return their original Baud Bandit 1.00 disk along with payment of $10.00 in U.S. funds to: *Attn: Baud Bandit Upgrade, Progressive Peripherals & Software, 464 Kalamath Street, Denver, CO 80204, (303) 825-4144. Inquiry #202.*

AS THIS IS BEING WRITTEN, I UNDERstand that AMax II, Readysoft's Macintosh emulator, is just about ready for shipment. It is a software upgrade that adds hard-disk support and sound capabilities to the original Mac emulator. The hard disk support is not universal, however, so you will have to check with Readysoft to determine whether or not your hard disk is being supported in the latest version. No upgrade details were available at this early date. *Contact: ReadySoft, Inc., 30 Wertheim Court, Unit 2, Richmond Hill, Ontario, Canada L4B1B9 (416) 731-4175. Inquiry #203.*

EXPRESS-WAY SOFTWARE, INC. IS now shipping Express Copy V1.5. Major improvements include support for the AEHD 1.52MB floppy drive, extensive ARexx support, and verified AmigaDOS 2.0 compatibility. Express Copy is a hard disk backup utility that can perform backups at up to 1MB per minute, and creates standard DOS disks that can be used normally from both the CLI and Workbench. Registered Express Copy users and Supra Hard Drive owners who received Express Copy with their drive can contact the manufacturer for details on the update. *Contact: Express-Way Software, Inc., P.O. Box 1029, Columbia, MO 65205-4005, (314) 474-2984. Inquiry #204.*

ACCORDING TO A POSTING ON People Link, Aztec C for the Amiga has been upgraded to Version 5.0d. Version 5.0d is a minor update of the Aztec C system which fixes problems in versions 5.0b and 5.0c. The major improvement to the software is Workbench 2.0 compatibility. Workbench 2.0 Include Files are supplied. Contact Manx for complete information on the update. *Contact: Manx Software Systems, P.O. Box 55, Shrewsbury, NJ 07702, (800) 221-0440. Inquiry #205.*

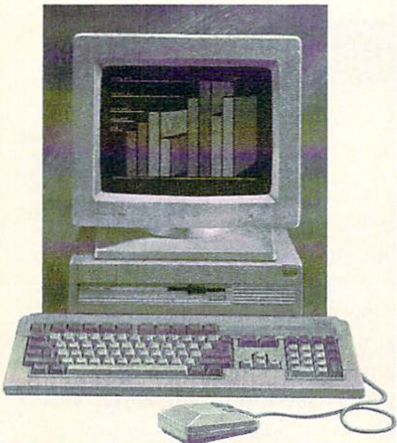
INTERACTIVE VIDEO SYSTEMS HAS recently released TCUtils 2.0 and an enhanced driver ROM (V4.0) for the Trumpcard Professional. The upgrade includes a fix for Amax-1 compatibility, enhanced SyQuest removable media support, and improved performance with read/write caching. The upgrade also includes SCSIShare, a shared access network implemented with the SCSI bus. Registered owners are being upgraded automatically at no charge. Unregistered Trumpcard Professional owners should contact IVS for the free upgrade. *Contact: Interactive Video Systems, 7245 Garden Grove Boulevard, Ste. E, Garden Grove, CA 92641, (714) 890-7040. Inquiry #206.*

That's all for this month. If you have any workarounds or bugs to report, or if you know of any upgrades to commercial software, you may notify me by writing to:

John Steiner
c/o Amazing Computing
P.O. Box 869
Fall River, MA 02722

...or leave EMail to
Publisher on People Link
or 73075,1735 on CompuServe

•AC•



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❖ Games ❖

WINGS - On A Wing And A Player

by Rick Broida

The list of good things that can be said to come from war is decidedly small: a stimulated economy,high patriotism, and the occasional great computer game. World War I, for instance, has allowed Cinemaware to bring us Wings, and while we can't alter the past, we can use the Amiga to relive whatever glories may have existed.

Wings is an extremely well-rounded, enjoyable game to play. As the title would suggest, it's all about flying. Your pilot takes to the skies as a member of the elite 56th Aerosquadron; a rather ambiguous role in that you are neither American, English, or French. One thing is clear, however: the Germans are your enemy.

Two factors set Wings apart from the current multitude of air combat simulators. First, the simple fact that it is set during World War I. Second, that it comes from Cinemaware, a company not known for creating arcade games.

Yes, you heard right. Wings is all combat, all action. The game is actually divided into three arcade-style missions: aerial combat, strafing, and bombing. Although the variety herein may seem limited, the repetition doldrums are completely absent. There are more than 230 total missions to complete, each with its own subtle distinctions. During aerial combat, for instance, your objective might be to shoot down enemy reconnaissance balloons or simply patrol for enemy aircraft. Strafing missions, on the other hand, test your shooting and maneuvering skills as you try to destroy supply posts and enemy troops.

Before you can grapple with your enemies in the skies, you must enter flight school to earn your wings. This task is actually a toned-down example of what you'll encounter during actual missions. To earn your wings and join the squadron you must either shoot down a balloon, strafe some barrels, or bomb two targets. None of these training missions are very difficult, and they do help in acclimating you to the combat to come. In fact, with this simple practice you could practically skip the game manual and jump right into The Great War.

Nevertheless, the game manual is worth reading. It has the distinction of being extremely well written and concise, something not many air combat games have been able to manage. Also included in the Wings package is the Aviator's Briefing Manual, a 76-page history of the pilots, planes, and battles of World War I. This is truly fascinating reading and appealing because it is not integrated into

IMPERIUM -The Subtle Empire!

by Tony Preston

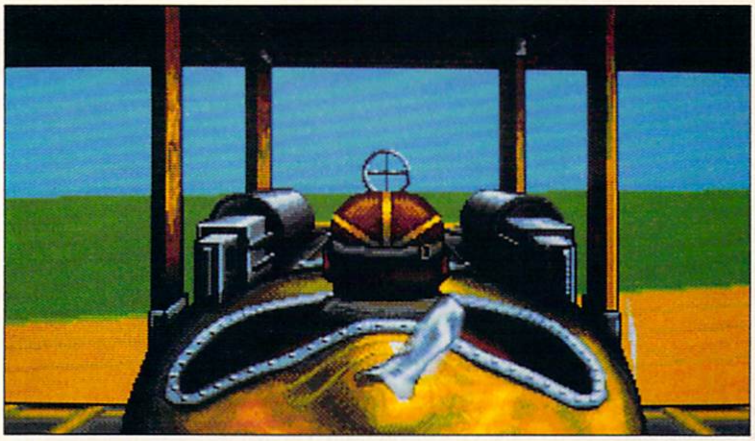
I like strategy games and Imperium is a good one! It is a game where you have been elected leader of Earth's empire and must lead that empire on to greatness. You must use a careful combination of economics, diplomacy and military might to either conquer your enemies or out live them! As any good leader, you are safe in your headquarters reading reports, and giving orders to your subordinates. You have to expand your empire by colonizing other planets, defend your empire against the other computer run players, and finally since you are elected, you must keep your population happy by keeping down inflation and ensuring a regular supply of commodities. Of course, you are not alone in the universe. As you check your information, you find that you have four other empires to trade, make alliance, treaties, and war. Nobody wants war(at least that is what they say!), but you have to be ready to defend yourself! You need cash to finance the colonization of those new planets, that may mean raising taxes. You also have to train troops and build up the defenses of those newly won planets! Most important is to find a continuing supply of Nostrum, the life preserving drug found only in certain places. Keeping a good supply of Nostrum will save your life from draining away into old age and death! Quite alot to do, managing planets, fleets, and an empire! You have subordinates to help run things. If they are good, you might want to share some of the precious Nostrum so they don't die off and be replaced with some stupid idiot that ruins that planets economy or gets a fleet in trouble. Of course, you have to be careful! You can't let those subordinates live that are not loyal! If one should become popular enough, they might get elected to replace you! You have to control those subordinates with bribes, and promotions. I found that one particularly disloyal subordinate was even trying to start his own empire, I got rid of him quickly by cutting off his supply of Nostrum! This is sort of like having a hit squad because once you have received the life giving drug, you must have it in at least small amounts or you die! You do have some help, the computer will automatically act as a loyal subordinate, allowing you to delegate temporary control over the military, diplomacy, and/or economics. This help can get you started or ease your task at anytime during the game. This can leave you to deal with the areas that need your special attention. Can you survive for the thousand years? Can you conquer all the other empires? These are questions only you can answer, if you don't succeed, the cost of failure is death!

Imperium has a window interface.

the instruction manual, an annoying habit of so many manual writers. It is also the source of the game's copy protection (game-manual protection is becoming something of a standard).

Wings requires one megabyte of RAM to run and is hard drive installable. Running it from a two-drive Amiga isn't too painful; disk access is relatively quick, all things considered. The graphics and sound in Wings are, as to be expected from a Cinemaware title, stunning. The aerial combat is as smooth as any flight simulator I've flown, with solid shapes and enjoyable crashes, along with the strafing and bombing missions looking as sharp as any game you'd find in any arcade. The music and sound effects, like in any good movie (Cinemaware bills its games as "interactive movies"), add beautifully to the realism of the adventure, which is the highest compliment I can give.

Wings is simply superb. The gameplay, graphics, sound, and instruction manuals all rate the highest marks. In fact, if you're out there, Cinemaware, I'd give your interactive movie a 10. And for those gamers keeping score, Wings comes from the same designers who gave us Rocket Ranger, a personal all-time favorite.



Wings, by Cinemaware

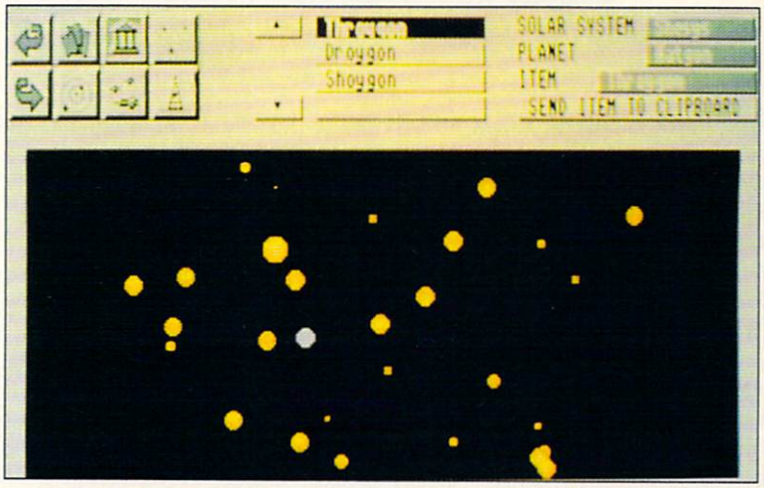
So while we can thank World War I for unwittingly bringing us the phenomenal Wings, we can hope that years down the road we're not all playing The Iraqi Conflict. Wings is realistic enough to make us remember that war is hell.

•AC•

Wings
Cinemaware
4165 Thousand Oaks Blvd.
Westlake Village, CA 91362
805-495-6515
FAX 805-379-9401
Inquiry #211

Each window has a title(such as planet reports for example) and will contain gadgets to select from the lists available(such as the list of planets). Each list is a scrolling menu. scrolling menus are similar to file requesters. When you select a list, it might have more items than can appear at once. To get to the items not visible, you can scroll either up or down the list, or type in a partial name and the item that matches will scroll up to the top of the list. Typing in "sa" made "saturn" appear at the top of the planet list in my game.

Clicking on the desired item with the mouse selects your item. You can hit escape to reset the search. After you have played for a while, you might have 30 or 40 planet which makes this type of operations really helpful. The Computer helpers will aid you in the game running the military, economics, and diplomacy. I recommend that you start out with all these options on. Most game players will want some actions fast. Invading a planet owned by another empire is a sure way to generate some action. Unfortunately it is also a way to make enemies quickly! This game requires you to think about your options. You can plan to wipe out all the other empires or just attempt to live for 1000 years! It takes along time to play to live 1000 years. I have my game up to 300 years and it has taken me a week or two! This game has a lot of surprises. You have total control over your empire, but if you do not keep you planets happy, come election time, it is out the door you go! Living to be 1000 yrs in office requires you to win at least 20 elections. I find myself running elections whenever my populatity looks high enough and it starts getting close(ten years or so). Everything is so quick, you will find yourself issuing order after order. I spent a couple of hours before I realized it!



Imperium, by Electronic Arts

(continued on page 59)

Explore the world of LOOM

by Miguel Mulet

The world is near apocalypse. Man has evolved new abilities in his never-ending quest for power over each other, and even over Nature itself. Mankind has also broken up into small groups, or Guilds, which work toward enhancing their own powers. These guilds include the Blacksmiths, the Shepherds, the Glass-Blowers, and the Weavers.

The Weavers are special in that they can weave patterns into their cloths, which give the cloths the ability to heal and bring wealth, or other special powers. But, the Guild of Weavers has become isolated because they only allow marriage to other guild members, and they soon retire to their own island of LOOM. The Weavers began to die off, and in the patterns they wove they foresee the coming of the Apocalypse. There is only one person who can either save the Guild of Weavers—or destroy them. That person is you, Bobbin Threadbare. Can you prevent the apocalypse?

LOOM is a fantasy adventure released by Lucasfilm. In it you assume the role of Bobbin Threadbare, a young weaver of special, and until now, hidden talents. At the start of your adventure you learn that all the members of the guild have vanished and you find yourself alone on the island of LOOM. If your search is successful, you will not only rejoin your people, you will save the world!

To begin your adventure, listen to the audio drama presented on a full 30-minute cassette (if you have trouble hearing one side, flip it over and listen to the other side; they are identical except for the type of Dolby recording, and your equipment may play one better than the other). This tape is produced by Sprocket Systems, a division of Lucasfilm which also does audio work for motion pictures. The dialogue, music, and sound effects are excellent. All three features set the stage especially well for this game.

There is a pencil and Book of Patterns which come with the game. The pencil is used to record the "spells" or "drafts" that you learn while on your journey. These spells are the magic that allow you to open and close doors, change straw to gold, and even tame a tornado or two. The Book of Patterns gives descriptions of the spells you may come across, but not how to cast them. They change from game to game, so be sure to use a pencil so that you can erase them. The Book of Patterns also acts as your copy protection device. At the start of the game, you are asked to spin a draft in order to gain entry as a member of the Guild of Weavers. All you need to do is look up the draft on the front or back of the manual, using the red filter provided.

Bobbin starts on the island of Loom high atop a mountain. The only thing present on the screen is the main window, in which all the action and animation takes place. There are no pull down menus, nor

MIDWINTER

by Miguel Mulet

Captain Stark is utterly alone, and under fire. He has just skied down to a hidden bunker, and pauses to catch his breath. The events of the last 50 years flash quickly before his eyes. There had been the collision with a colossal meteor in 2039 (which plunged Earth into a new ice age); the continents had shifted; new glaciers formed and moved across Earth (displacing billions of people who went in search of warmer climates); and in the warmer lands, wars ensued over who would live in certain areas.

Eventually, the entire Earth was covered in ice and snow. Fortunately, Captain Stark's ancestors had discovered this island many years ago, and escaped to it to avoid the horrors that mankind was committing on the old continents. They had lived in peace for many years ... until now. A new refugee from the mainland has brought with him the aggression of the rest of the world, and now, he wants to make this island his own. This fiend is General Masters, and he has amassed an army of thousands!

"How can my 32 man force defeat him?" is Stark's only thought. It is then that inspiration hits him ... he realizes he can win! But ... is there enough time?

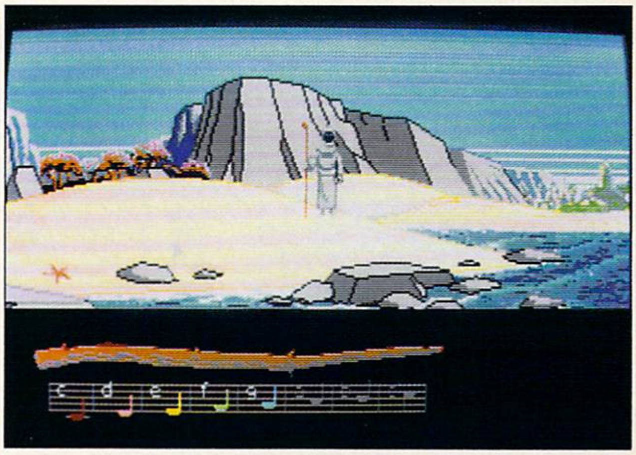
"Midwinter" is a complex action/strategy game, with heavy emphasis on the strategy. You are in control of the Free Village Police Force (FVPF), a group of 32 men and women who were enough to police the island of Midwinter prior to the rise of General Masters.

Stopping General Masters is much easier said than done. First, you must contact the rest of your force and recruit them to join your cause. Next, you must find a way to slow down the advancing forces of the General; and lastly, you must find and destroy General Masters's headquarters. Complicating matters even more is the fact that the ice age continues, and all the fighting must be done in guerrilla fashion on the snow-covered land of Midwinter.

As the game begins you are in control of Captain John Stark. He is armed with grenades and a rifle, and his only mode of transportation is skis. The island is powered by 16 Heat Stations, which are pumping heat from Earth's core in order to provide energy to the villages on the island. If General Masters obtains control of these Heat Stations, all is lost. This is where the strategy comes in because Captain Stark must assemble his forces and destroy the enemy headquarters. The strategic part of the game is choosing the best way to accomplish this task in this difficult, snow-blown terrain. In Midwinter, the land is as much your enemy as the evil General.

All movements are accomplished via the mouse or joystick, although joystick movements are the most difficult. Skis are a dialogue box. You just move the mouse, point to where you want to go, and click. Once you find the "distaff", you can weave drafts by pointing at the object you would like the draft to effect, and then click on sections of the distaff. (The distaff appears at the lower left of the screen. See Figure 2.) If you play in the lower two levels (two out of three), the drafts are played out on the distaff as they are discovered, so that you can record the notes. On the upper, expert level, you must play the game "by ear". Drafts are played on the speakers as they are discovered, but not played on the distaff. Your reward in the expert level is some extra animation not seen in the standard game.

That's all you need to know to play the game, and explore the world of LOOM. The programmers didn't forget the necessities, such as a pause feature, sound on/off, save/load game, or quit/restart the game. These functions are available by hitting the appropriate function keys. As you are exploring, the game will often begin an animated scene by itself. During these scenes you sit back and watch what is going on, as the computer takes the character through the events which transpire. If you're replaying the game, the ESC key will bypass the scene. This interface works well, and eliminates typing. The other advantage is that it is easy to play for children and adults alike, making this an excellent family adventure.



Bobbin is ready to search new worlds, distaff in hand!

Spread over three copyable disks, LOOM creates an incredible world in which the player becomes absorbed. The animations, graphics, and sound effects are all well done, and the plot is mysterious and inviting. Advanced adventurers can complete the game in about 8 hours, while beginners will probably take 14 or more hours to complete the game on its easiest level. To see all the animations, you must complete the game in its expert mode.

If you get an Amiga in your Christmas stocking, LOOM would make an excellent addition to your new software library.

•AC•

LOOM
Price: $59.95
Lucasfilm Games
P.O. Box 10307
San Rafael, CA 94912
(800) 782-7927
Inquiry # 212

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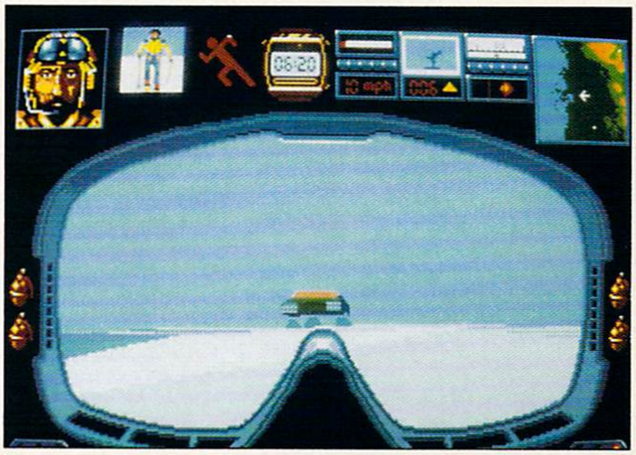
available to all characters, but they can also find other forms of transportation, such as hang-gliders, snowmobiles, and cable cars if they visit the appropriate places (snowmobiles are found in garages, cable cars are in the mountains, and hang-gliders are found at cable car stations). Learning how to ski is an acquired trait, as is driving a snowmobile, or hang gliding. If the character tries to navigate on too slippery a slope, he causes an avalanche, which leads to damaged body parts or broken equipment.

Although the game comes with a pre-printed map, the most useful map is the one provided on the computer screen. It is here you can find out where your other police force members are located, as well as the locations of other areas of strategic significance. The relief view of the map gives you a good idea of how rough the terrain is. Whether your VFPF characters are destroying enemy installations or recruiting other members they will use these maps as a guide to their objectives.

To make the program realistic, the characters need food and rest to survive. Both items may be acquired at many different locations, including huts, churches, and homes. Failing to acquire enough of either leads to fatigue and blackouts, which depletes your overall strength. Supplies such as dynamite, bullets, and grenades can be obtained at stores. The dynamite is used to destroy factories, warehouses, and other locations from which the enemy is getting restocked. Police stations are where most other members of the FVPF can be found.



Enemy vehicle spotted. You can blow him away with bullets, or hand grenades!

As in real life, recruiting fellow officers can be complex. Each character has certain attributes that make him liked or disliked by other characters. This means that if you send one character to recruit another that doesn't like him, he may not join the force. Your clues to these interper-

(continued on page 59)

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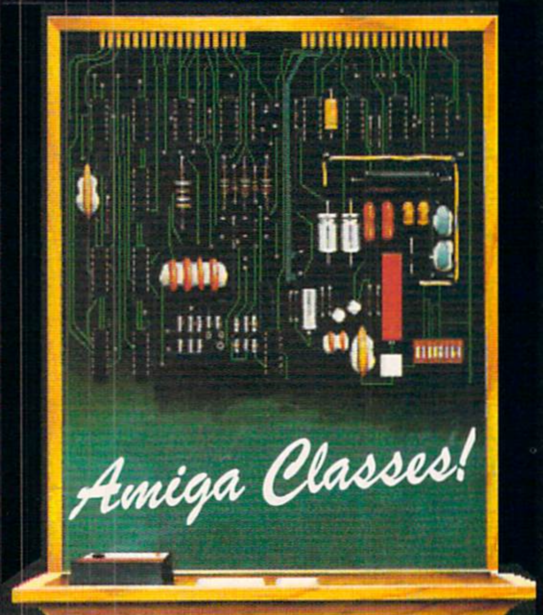
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ANIMATION I will cover the basics of animation in general and Amiga animation specifically. Different animation options will be discussed with an emphasis on two dimensional animation.

ANIMATION II is a continuation of Animation I and delves more specifically into artist's technique. Three dimensional animation is the primary topic for this course.

INSTRUCTOR:STEVE SEGAL

Working with Amiga Graphics

GRAPHICS I covers all aspects of the current state of the Amiga art of illustration. The advantages and disadvantages of different Amiga resolutions will also be covered.

GRAPHICS II will cover specific techniques on computer illustration. These topics include palettes, anti-aliasing, landscapes, and color-cycling.

INSTRUCTOR: BRADLEY SCHENCK

The Amiga as a Pro Video Tool

VIDEO I covers basic technical video concepts that concern Amiga users. Amiga graphic techniques for video and informal questions and answer sections form the basis for this class.

VIDEO II is a continuation of Video I. This class will take an effect-oriented approach, demonstrating the usage and combination of various Amiga programs.

INSTRUCTOR: ORAN J. SANDS III or
GENE BRAWN

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(Midwinter, continued from page 57)

acter synopses presented in the 192-page manual.

The characters are controlled entirely through a well-done icon interface. If you want a character to rest, click on the icon with the sleeping figure. Thus, manipulating each character is a snap. It has to be, because you have to control a number of different characters in order to win the game. Wisely, the programmers make you take turns with each character, controlling their actions individually, instead of making you control all characters at once. If desired, however, you can put several members onto one "team".

The graphics are 3-dimensional, and can be viewed from all angles. Scrolling is a little choppy in all of the transportation modes, regardless of speed. Most of the animation sequences are a bit limited, and the sound effects are adequate, though not astounding. They do put the Amiga's stereo ability to good use in that enemy vehicles on your left emit sounds from the left speaker, and so with vehicles approaching from the right. The point-and-click interface is well done, leaving the keyboard to be used for various commands such as firing weapons and saving the game.

Where "Midwinter" really shines is in the actual gameplay. This is a hard game to play strategically, yet I found myself spending hours trying to get my forces in position to overcome the opposition. Even though the graphics and sound weren't "great", I found myself coming back for more of this exciting challenge.

An interesting game scenario is presented in the manual. It gives a full historical account of the events leading up to the current situation; however, it is a bit long. Although the story is interesting, the most important parts of the manual to read are on maneuvering the different transportation devices, and the strategic tips on winning the game.

If you prefer pure action-arcade games, I would stay away from this one. If, however, you would like to become fully enveloped in a strategic guerrilla war that needs to be fought with both brains and brawn, definitely take a look at "Midwinter". •AC•

Midwinter
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(Imperium, continued from page 55)

Another helpful feature is the clipboard. You use the clipboard to keep track of things to do. By using the clipboard, you can send an item from the clipboard to another window. This allows you to issue a command to a fleet for instance. You use the clipboard in conjunction with the map. The map is a computerized picture of the known universe. With it you can get a wealth of information. You find out where different solar systems and planets are located. You can also find out which are owned by you and the other empires.

One of the gadgets on the map allows you to send names of selected fleets and planets to the clipboard. My only complaint with this feature is that it is not large enough! The clipboard does not scroll like other lists. By sending a planet and a fleet name to the clipboard you can use it to issue orders to a fleet to move to that planet. I just wish it was larger and scrolled.

There isn't alot of graphics or sound with this game. The only sounds are some music at the startup and before news items are displayed. I found that the news item music slowed down the game(you get alot of news each turn with a large empire!) so I mostly ran with it turned off. You get news pictures when viewing a news message. The whole game is done using black on gray. It would have been a little nicer to have some real graphics or even some simple animated sequences to liven up combat reports! The windows and graphics while simple allow you to move any window to the front by just clicking the mouse in the window.

The game is fast, even from a floppy. There is only a small amount of disk accesses during a game. The play is fast, it just takes time to decide what you want to do! Tons of reports to look at each turn and many orders to issue! The game takes alot of planning, you have to design your ships, create fleets, build ships for those fleets. All this takes time, money, and natural resources. An empire might be able to build a small fleet with the available money and resources, or it might go into debt(you pay interest on those loans) and try to create a large one. There is a limit of 10 fleets and 80 ships in the game. This forces you to plan you fleets and balances the play.

The disk is not copy protected, the game uses a simple manual protection that only occurs on the first turn after the game is started. You are asked to enter one of the eight items listed in the manual for the subordinate shown on the screen. My biggest complaints are that there are no instructions for installing this game on my hard drive and that it does not multi-task. It was pretty simple to install on my hard drive, I just copied the disk to a directory and assigned "Imperium:" to the directory. I changed the startup-sequence file to do this and shut down some of my utilities prior to the Imperium startup. Unfortunately, since the game will not multi-task, I had to dedicate time to play it. The game forces a re-boot when you want to quit, since the quit option in the menu will just allow you to start a new game. It would have been nice to be able to play while my programs are compiling, or a download was occuring!

If you like strategy games like Balance of Power, or Empire, you will definitely like Imperium. I have only been around in my game for about 300 years and Matthew Stibbe, the author told me on BIX that there are many surprises still await my empire! Imperium was written in Great Britain by Matthew Stibbe and Nick Wilson. It is distributed by Electronic Arts. I definitely recommend it! Now.... How can I stop Saturn from revolting? Send in the Drop Troops! Charge! •AC•

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AC Disks

Source code and executable programs included for all articles printed in *Amazing Computing*.

1 AC V3.8 and V3.9

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2 AC V4.3 and V4.4

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5 AC V4.9

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6 AC V4.10 and V4.11

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8 AC V5.2 and V5.3

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9 AC V5.4 and V5.5

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12 AC V5.11 & V5.12

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ROOMERS

by The Bandito

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The news from West Chester continues to be interesting. Despite attempts to clamp down on security leaks, The Bandito continues to find tasty tidbits seeping out through the cracks. There is nothing like a fast rummage through a dumpster to find some revealing memos or technical drawings, but the hard part is driving away at high speeds over those mountains in the parking lot (euphemistically referred to as "speed bumps"). It's just another day in the life of a gossip columnist braving danger to bring you your monthly diet of information.

From a memo found buried under a pizza box, The Bandito has discovered more information about the much-touted CDTV system. You know, the one that Nolan Bushnell is hawking. Did anyone happen to ask what year that "fall" shipping date was supposed to be in? Well, according to the latest data, it looks like CDTV may not ship until spring of 1991. The Bandito has found out there are several reasons for this delay.

For starters, there's no real development system yet. According to one developer, Commodore's advice was to "put the software on a hard disk and we'll master it for you." So how does this help the developer put high-quality audio and full-motion video into his products? That's treating a CD-ROM just like a big floppy disk, and that is a big mistake. For one thing, it means a lot of developers won't take you seriously.

Another thing that's delaying CDTV is an attempt to be competitive with CD-I, which now offers full-motion video and CD-quality sound. Commodore thinks that CDTV needs support for real-time HAM mode movies, which is mostly a software problem. After all, anybody who saw NewTek's Demo Reel II (which was only shown and never released) knows that it's possible. Maybe Commodore could buy some technology from NewTek and put it all together. Another possibility being considered is to include circuitry to create a video-quality mode with millions of colors, possibly even fast enough for animation.

Commodore has announced that CDTV will be "upgradable" to CD-I when that chip set is available. This means the hardware has to be redesigned to allow for that possibility, and the software must also take that into account. It's a tall order, and filling that order takes time.

Thus, there are quite a few issues that remain unresolved for CDTV: exactly what the hardware and software capabilities will be, what the software support will be, and what the market will be. Is it education? Corporate training? Games? The mythical "home computer"? The Bandito will be watching closely to see how this turns out. Stay tuned, sports fans. It promises to be an exciting game.

Speaking of games, Apple has been making some aggressive moves lately. They finally woke up to the fact that their computers were too expensive, and started releasing cheaper ones, although they are still not cheap enough to beat the Amiga. In Europe, where the price difference was even more amazing, The Bandito hears that the new Mac Classic may be priced the same as the A500 in the UK—about 400 pounds. System prices will be comparable to an Amiga 500, though of course there's no color, the screen has lower resolution, and there's no animation support. And, unless Commodore finally decides to lower the A500 price, the U.S. market value will also be fairly close. The Bandito knows that they've been toying with the idea, but this move by Apple may be just the jolt Commodore needed to stir up some action. Look for a price cut before Christmas, and perhaps a significant cut early next year.

The Bandito thinks that the Mac Classic is not so much of a threat, but the Macintosh LC is more competitive. Especially in the business marketplace, it's priced and equipped comparably to an Amiga 2500. The Bandito fully expects that Commodore will engage in another round of price reductions to meet this challenge head-on. The emphasis will be on desktop video, since the Video Toaster is powerful ammunition for that fight.

The Macintosh market is now awash with 3-D animation software. It seems like they noticed how well that material does on the Amiga, and the prices are incredible! The least expensive is $500; many are $700 or $800, and there are several $1500 packages. One of the more complete packages is priced at a low, low, $7995! And most of this software isn't complete! You have to go and buy a modeling package separate from the animation and rendering package.

Well, OK, but does this Mac software work better? Hah! The Amiga's 3-D soft-

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ware, besides being remarkably less expensive, has had years to acquire the polish that you just can't find on the Mac. Now if only Commodore can get the word out, they should be able to do very well in this market. That's why their Siggraph appearance was so important.

It seems that the bad news has finally arrived for A-Max. As of September 15, Apple has allegedly stopped selling Mac ROMs to dealers unless they are in exchange for a "broken" set. Previously, Apple dealers could buy as many ROMS as they liked, for $120 a set. But Apple has finally noticed just how many ROMs were ending up in emulators like A-Max, and has decided to clamp down, particularly since Apple will now be selling a low-cost Macintosh. The Bandito doesn't know if this prohibition will be permanent, but you'd better make sure you can get Mac ROMs before you buy your A-Max.

Gold Disk has finally succumbed to the lure of other software platforms. They are currently working on a version of ShowMaker for the Macintosh. In fact, The Bandito hears they are working on both a low- and a high-end version. Of course, the low-end is a measly $195 and the high-end is $495. The Bandito hopes that Gold Disk is ready for a fight, since that Macintosh market is very expensive to compete in, and the boys from Canada don't know their way around the territory. Just look how well Byte-By-Byte has done with Sculpt for the Macintosh—that is, not well at all. But since that is where they make most of their money, this won't mean less support for their line of Amiga products.

The Video Toaster was finally shipped out before the end of September, as promised, which is cause for cries of rejoicing. Unfortunately, the quantities sent out were very limited at first. A few lucky people are very happy to have received their wonder hardware, while the rest of the world awaits the volume shipments still to come. The Bandito predicts that while NewTek will ramp up as fast as they can, the demand will grow even faster. It'll probably be months before NewTek can keep pace with the demand. But now that the Video Toaster is finally out, The Bandito expects a bevy of videos to be created using this new technology. Of course, when a home user begins to create videos, they'll probably be just as graphically appealing as the first desktop published documents ... that is, really ugly.

The Bandito also expects to see new records set for the number of digital video effects per second in rock videos once the Toaster gets around.

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It's been a long wait for those who have been seeing the Video Toaster demo'ed for years. Why did it take so long before they shipped it? The Bandito hears that it's because they stuffed many more features into the Toaster than originally planned. Among other things, the Video Toaster now includes ToasterPaint, a 24-bit paint program which is based on DigiPaint 3 technology, and Allen Hastings' LightWave 3D animation and rendering software. The hardware can now do a whole range of coloring effects, including some that can be found on no other piece of video equipment. Also add in luminance keying, genlock, and switching between seven possible sources and you end up getting a mixture that's quite explosive. It's no wonder it took such a long time to put the Video Toaster package together.

The Toaster has been attracting attention from the mainstream computer press and even the national media, including coverage by CNN and Preview. And the venture capitalists have, of course, been waving their money around, but NewTek isn't taking any, preferring to maintain control of the situation. The Bandito thinks that's the smart move. Why some of these vultures would want the Toaster to be put into a Macintosh or a PC is anyone's guess. But not to worry, Tim Jenison would never allow that to happen to New Tek's prized possession.

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In other video news, NEC is introducing the PC-VCR, an S-VHS deck designed to be controlled by PCs. It offers single-frame accuracy for about $2,000. You may ask, "What's so important about that?" Well, it's just what you need to make those incredible animations you've seen from Allen Hastings. Lower-cost models are in the works, along with an inexpensive TBC built into the high-end model. PC and Mac controller software is also in the works; could the Amiga be far behind? Just think—if you combine it with a Video Toaster, you could have a complete homemade TV studio.

Commodore has upgraded the base A3000 hard drive from 40 to 50 megabytes with no price change. That's a nice little added bonus, don't you think? The Bandito hears that the A3000 has been selling well, although a number of third-party cards don't work in it yet. The reason is purely mechanical; the space available changed between the A2000 and the A3000. So a number of products will have to be revised, but it shouldn't take too long. Chief among the products to be changed is the Video Toaster. Commodore is especially eager to get that working with the A3000 series as soon as possible.

The 68040 has been delayed again by Motorola; it's not expected in quantity until Christmas. That means the '040 Amiga won't be out until then, either. Do expect, however, an introduction at the CeBit show in March. The 68040 delays are also holding up those accelerator card manufacturers. The first few cards probably won't be out until early 1991. But those babies should really scream, especially for things like ray-tracing. Now let's see ... who wants to do the first flight simulator with real-time, ray-traced, 3-D graphics? The Bandito will surely try his hand at one.

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Commodore is working hard to push the Amiga, primarily because their other computer lines aren't doing particularly well anymore. They have allegedly shut down production of C128s due to lack of sales, while sales of the C64 and the Colt (CBM's low-cost PC clone) are also down considerably. So, more effort is being put behind the Amiga product line, particularly in the sales and marketing areas. Commodore is now looking to the desktop video market to be the flagship application that sells the Amiga to businesses.

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In line with their emphasis on desktop video, Commodore is said to be exploring a strategic relationship with a major manufacturer of video equipment. It's possible that we may see versions of professional-quality video recorders designed to work specifically with the Amiga—including special software to control those devices. There might also be a co-marketing agreement to help move the Amiga into professional video equipment stores. The goal is simple: low-cost, along with easy-to-use video editing capability. Add a Video Toaster to that and (again) you have a complete video studio.

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Speaking of studios, more and more movies are using Amigas to prototype their effects and graphics. It's much cheaper to look at some titles done on ab Amiga to decide if they are the right style, rather than getting them done by traditional methods. It saves a lot of time, too, which is often more precious than money in the movie business. And it's not just prototyping, either. Many productions—particularly science fiction movies—are using the Amiga for on-screen graphics. Ironically, the artists often are told to make the graphics look worse than the best possible on the Amiga—otherwise, they wouldn't look like the computer graphics producers want!

Of course, with all this video, animation, digitized sounds, and 24-bit graphics, data storage is becoming a problem. The Bandito has some good news for those of you who just can't fit everything on your hard disk. A rewritable optical storage is coming for the Amiga, and from more than one company, too. This magneto-optical drive resembles a CD-ROM, but it's fully erasable and rewritable, just

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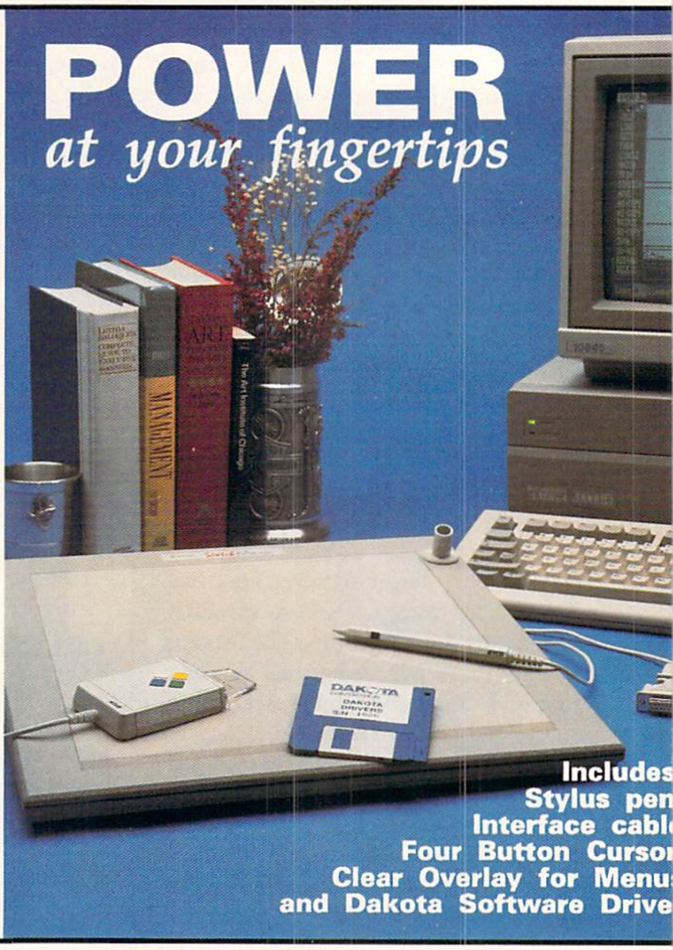

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like a floppy. And it stores 650 megabytes of data on one disk (some models can handle over 1 gigabyte). The access times are slower than hard drives, but still quite fast. Expect the first models early in 1991, though you should be prepared for some "sticker shock". The drives won't be much less than $5,000 to start with, although prices should come down significantly in the next few years.

If 650 megabytes isn't enough, there's new technology on the horizon that may be just the ticket. There's a company that is experimenting with holographic storage techniques using crystals. We're talking terabytes of storage (that's 1,000 gigabytes) with access times measured in microseconds, which is faster than most RAM chips. Lasers are used to scan for changes in the crystalline structure. And the crystal is entirely solid state with no moving parts, so it should be extremely reliable. The cost? Well, by the time it gets to market in 1995 or thereabouts, probably under $10,000—and dropping fast.

The Bandito hears that Commodore has finally dragged one of its top-secret projects out of the lab and into the marketplace. The big C has announced the debut of the C64 Games System, which is essentially a C64 with a cartridge port and a joystick included. They expect to compete against the Nintendo and similar game machines, except that the C64GS has an upgrade path.

For those of you who really want to expand your A500, there's the new Bodega Bay expansion chassis from California Access. It sports room for 4 Zorro slots, three drive bays, and a built-in 200 watt power supply. Yeah, throw that old powerbrick away. The price? Expect to see it for around $300, which is a real deal for turning your A500 into a reasonable facsimile of an A2000.

Will Egghead begin carrying Amiga software? It may well happen in 1991. Egghead has been a staunch supporter of Apple II software, but with the market for that falling fast, it seems unlikely they'll continue to stock it. Amiga software is already selling far better than Apple II software, and Egghead is gradually beginning to recognize that fact. Of course, it's going to require a drastic change in attitudes at the head office, but money talks very loudly.

Workbench 2.0 looks like a New Year's baby, from the tea leaves that The Bandito has seen. Well, The Bandito can wait ... barely. It'll be worth it if the bugs are kept to a minimum, which is the whole idea. The big question is: who will have the first 1280 x 400 resolution game?

Next time, The Bandito will once again present some fearless predictions for the New Year, attempt to make last year's predictions look like they came true, and throw in a few surprises for everyone to sink their teeth into!

•AC•

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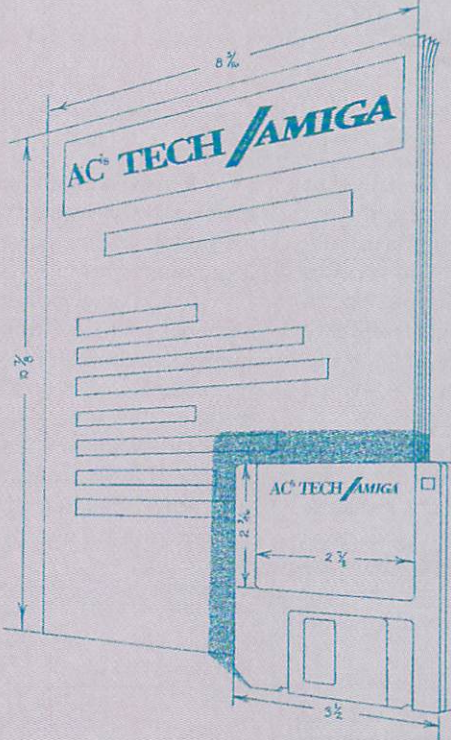

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C NOTES

From the C Group

by Stephen Kemp

Pssst! Can I tell you a secret? Cryptography is the subject of this month's column. Defined as the process of writing or deciphering messages in code, the science of cryptography is usually divided into two opposing areas of expertise: constructing codes and breaking codes. One side's job is to create ciphers that cannot be compromised and, conversely, the other side's job is to prove that an unbreakable code cannot be created. Incredibly, thousands of people, employed by various governments, are devoted to one side or the other in the science of cryptography.

On our side of the world, encoding of databases and files is a common task that programs must support. Usually, the methods used to encrypt files are not tremendously sophisticated since the time required to encrypt and decrypt files and records must be kept to a minimum. Primarily, file encoding in the business world can be compared to installing an alarm system in your home. It may not stop the expert criminal, but it will stop the majority of thieves.

To make this discussion of cryptography a little easier to understand, a couple of definitions are in order. There are four primary items in a cipher system. First, "source" refers to normal text information. The simplest source contains the space character ("_") followed by the letters of the alphabet—a total of 27 characters. Second, "cipher" refers to encoded text information. Third, "method" is the algorithm used to create encoded information. Finally, a "key" is used by a method to encode and decode information. Naturally, the method is at the heart of any cipher system.

One of the simplest methods is named the "Caesar cipher", and there are a couple of variations in this cipher system. The first method takes each letter from the source and adds a number (the key) to the letter before placing it into the cipher text. The letter for a result that is greater than 26 can be found by subtracting 26. Here is an example using this method with a key value of 2:

Source		Method		Cipher
H	=	H+2	=	J
E	=	E+2	=	G
L	=	L+2	=	N
L	=	L+2	=	N
O	=	O+2	=	Q

HELLO = JGNNQ

It should be obvious that this method is reversed by subtracting the key instead of adding. Also evident is the fact that this method would not be very difficult to defeat since there are only 26 possible scrambled key combinations.

The Caesar cipher can be improved by using a substitute alphabet as a key instead of a simple constant offset. In this method, each letter from the source text is substituted with the character found in the "true" alphabetic position of the key. For instance, the letter 'A' would occupy the second alphabetic position (the space usually occupies the first position). This method would substitute every 'A' in the source with the letter in the second position of the key alphabet. An example of this method might look like this:

Alphabet: _ABCDEFGHIJKLMNOPQRSTUVWXYZ
Key: ZOBSAR_WGLHTEUIDPXCNYVFJMKQ

Source		Method		Cipher
H	→	(H=G)	→	G
E	→	(E=R)	→	R
L	→	(L=E)	→	E
L	→	(L=E)	→	E
O	→	(O=D)	→	D

HELLO = GREED

This method is safer than the first one and is still very simple to implement. Unlike the first method, if you tried to break this cipher sequentially, it would take millions of combinations to find the key.

A code breaker, however, would not start randomly assigning alphabets to the cipher. Instead, an examination would be made of the cipher text and then the frequency of occurrence for each letter would be applied to the frequency commonly found in the language. For instance, most everyone knows that the letters "E", "S", "T", "R", and "N" are very common in the English language and, by using the knowledge of letter frequency, an expert code breaker could make an educated guess as to where each letter corresponds in the key alphabet. By applying the common letters into the cipher text, breaking the code becomes analogous to playing "Wheel of Fortune".

Very seldom in programming will you find methods like this in use because they are so simple. On the other hand, most file systems today simply require you to define a password in order to gain access. The password is the key, but the secret is in the method used in "applying" the password to the source. I won't claim inside knowledge of how other programs handle their encryptions, but we'll be able to examine a method using a password for protection.

Listing One contains a sample program named SECRET.C which uses a method of bit manipulation called "Exclusive ORing" (XOR) which is applied between the characters in the password and those found in the file. It is a code simple to implement, but more difficult to break than simple character substitution from an alphabet. This is made possible because all the characters in the file (not just the alphabetic ones) can easily be encrypted and later decrypted.

To discuss the method used in the program SECRET, assume that the password to be applied to a file is "SECRET" (pun intended). The first character in the file would be XORed with the first character in the password (S); the second character from the file XORed with the second character (E); the third with the third character (C), etc. When the end of the password is reached, the process simply begins again with the first letter. This continues until the entire file has been encrypted. Other than its size, the resulting file will bear little resemblance to the original.

For those who are unfamiliar with the logical XOR operation, here is a quick definition. Usually, a logic table is the easiest way to explain the operation. Logically there are only two values, TRUE and FALSE. Exclusive ORing each possible combination is shown in this table:

TRUE xor TRUE = FALSE
TRUE xor FALSE = TRUE
FALSE xor TRUE = TRUE
FALSE xor FALSE = FALSE

In simple terms, an XOR operation can be explained as "one or the other, but not both." A value XORed with itself results in a FALSE condition, and any value XORed with FALSE equals itself. Exclusive ORing is a clean method because the same method is used to reverse the cipher. This can be demonstrated best by examining the bitwise operation that occurs using binary numbers. First we'll need to XOR two numbers and find the result:

Source	1 0 1 0 0 1 1 0
XOR key	0 1 1 1 0 0 1 1
Cipher	1 1 0 1 0 1 0 1

This example demonstrates the important concepts introduced by the logic table. Each "1" represents a TRUE value, likewise each "0" represents FALSE. Using the logic table presented above to determine the operations involved between the source and key, we can derive the cipher. To restore the source all you have to do is apply the same key to the cipher. Here is an example:

Cipher	1 1 0 1 0 1 0 1
XOR key	0 1 1 1 0 0 1 1
Source	1 0 1 0 0 1 1 0

Now you know the secret of the program in Listing One. A password is used to encrypt an input file using the method that we just discussed. Once finished, the process can be easily reversed by re-running the cipher text through the program using the same password.

This method has a few flaws (like most ciphers), but they are not as serious as those found in the Caesar cipher. The primary flaw in the XOR operation can be found when the text file periodically contains a series of the same character. For instance, it is not unusual to find a series of spaces, or underlines, etc. If a short password is used, the repetition can be easily identified. Once XORed with the appropriate character, the key can be discovered. Therefore longer passwords are much safer to use.

Listing One

```
/* SECRET.C is a program that accepts a list of filenames or     */
/* wildcards and will read and rewrite each file altering the    */
/* text by encrypting it using the letters found in the password */
/* - also supplied on the command line and distinguished from a */
/* filename by a leading hyphen (-). The same password is used   */
/* for all files. To restore a file to its original state the    */
/* file must be submitted to the program again using the same    */
/* password that was used during the encryption. Before actually */
/* changing each file, the user is asked to confirm the changes. */
/* During encryption, this feature is not of much value. During  */
/* decryption, however, this will allow the user to determine    */
/* that the file is being restored with the original password.   */
/* If a "standard" open fails on a file it is skipped.           */
/* If compiling with LATTICE the LATTICE keyword is defined for  */
/* you.  With MANX, the alternate routes will supply the code    */
/* necessary to make the program operate.                        */

#include <stdio.h>
#include <fcntl.h>
#ifdef LATTICE
  #include <dos.h>
#else
  char * scdir();

  strupr(buf) /* this function is not supplied with Manx library */
  char *buf;
  {
     for(;*buf != '\0';buf++) *buf = toupper(*buf);
  }
#endif
#define TRUE  1
#define FALSE 0

#ifdef LATTICE
main(short argc,char *argv[])     /* program start */
#else
main(argc,argv)
short argc;
char *argv[];
#endif
{
    char  *fptr;                  /* pointer to filename area */
    unsigned int count,ct;        /* counter for read/writes */
    short cnt;                    /* counter for files    */
    short ndx;                    /* index for arguments  */
    char  *pword,*pw;             /* Encryption word pointers */
    char  first;                 /* first read indicator */
    int   ifp,ofp;                /* file io handless     */
    char  lbuf[256];              /* line buffer          */
#ifdef LATTICE
    struct FILEINFO info;         /* file info pointer    */
#endif
    if (argc <= 2){               /* if not enough arguments provided */

errout:                           /* exit point if error discovered */
        printf("Encrypt the bytes of a file \n");      /* announce */
        printf(" SECRET  -password  file [ file ] ...\n");/* example */
          printf("        where password is the encryption
password\r\n");
          printf("        first run encrypts, second run
```

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```
decrypt\r\n");
        exit(0);                    /* exit the program */
    }

/*------- Check for flags and switches here -------*/

    pword = NULL;                               /* indicate no flag*/

    for(ndx = 1; ndx < argc ;ndx++){            /* examine arguments*/
        if (argv[ndx][0] == '-')                /* found an indicator*/
            pword = &argv[ndx][1];              /* remember the pword*/
    }
    if (pword == NULL || *pword=='\0') goto errout;/* no password so
exit*/

    strupr(pword);                              /* alter case*/

    printf("Applying password to file(s) \n"); /* Indicate message */

/*------------------------------------*/
#ifdef LATTICE
    fptr = info.fib_FileName;                   /* simplify name */
#endif
    for(ndx = 1; ndx < argc ; ndx++){           /* examine arguments*/
        if (argv[ndx][0] == '-')                /* flags already found*/
            continue;                           /* so skip to next */
#ifdef LATTICE
          if (dfind(&info,argv[ndx],0) != 0){       /* no matches */
              printf("-No file matches %s-\n",argv[ndx]);
              continue;
          }
#endif
          for(cnt = 0; ;cnt++){             /* look for wildcards */
#ifdef LATTICE
            if (cnt != 0)
                 if (dnext(&info) != 0) break;/* end of the chain */
#else
            if ((fptr=scdir(argv[ndx])) == NULL) break; /* end of chain
*/
#endif
            if (access(fptr,0) == 0){              /* if file is found */
                printf("*** %s ***\n",fptr);   /* display filename  */
```

```
/*---- Utility program specific code goes here --------*/
                first = TRUE;                   /* first time flag */
                pw = pword;                    /* point to password */
                ifp = open(fptr,O_RDONLY,0);    /* open file for read*/
                ofp = open(fptr,O_WRONLY,0);    /* open file for write*/
                if (ifp <= 0 || ofp <= 0){      /* if opens fail*/
closefile:
                    printf(" - skipped - \n");
                    if (ifp > 0) close(ifp);   /* close if open */
                    if (ofp > 0) close(ofp);   /* close if open */
                    continue;                  /* continue looping*/
                }
                for(;;) {                       /* loop through file  */
                    if ((count=read(ifp,lbuf,256)) <= 0) { /* EOF */
                        close(ifp);           /* close file */
                          close(ofp);           /* close again*/
                        break;                /* end loop */
                    }
                    for (ct=0; ct < count; ct++){ /* time to work */
                            if (*pw == '\0') pw = pword; /*reset
password*/
                        lbuf[ct] ^= *pw++;               /* XOR */
                    }
                    if (first){                /* if first line */
                            first = FALSE;    /* no longer first */
                            if (accepted(lbuf,count) == FALSE){
                                goto closefile;   /* not accepted */
                        }
                        printf(" Accepted \n"); /* continue */
                    }
                      write(ofp,lbuf,count);    /* put the line back*/
/*------------------------------------*/
                }
            }
          }
#ifndef LATTICE
          if (cnt == 0){
                  printf(" - No files match %s -\n",argv[ndx]);
          }
#endif
```

(continued on page 88)

PD Serendipity

Insight into the World of Public Domain Software for the Amiga

UTILITIES & SMALL PROGRAMS

Adapt (FFD #378)

Adapt is a CLI utility that will convert special German characters while porting to an MS-DOS machine to the correct Amiga codes. This version is set up to only handle the specific letters listed in the documentation, but the program can easily be changed. Adapt can also change a tab to a space or spaces if needed.

To change the code to convert your special characters, all you need to do is find the code of the characters you want to convert. This can be found in the documentation of your PC. Simply plug in the character code in the correct line of the source code, and that's it. This is explained fully in the documentation provided with the program. This is version 2.2. and includes source. *Author: Lars Eggert*

Append (FFD #379)

Append is a CLI utility used to append or join two or more files directly. It is similar to the AmigaDOS JOIN command, but shortens the steps. Includes source. *Author: Oliver Enseling*

LLSort (FFD #379)

LLSort can replace the AmigaDOS SORT utility. It has its Pure bit set and can be made resident. LLSort has more features than the SORT command. It can sort files in ascending or descending order, lets you sort with case sensitivity and has the ability to sort with numbers placed after letters. Includes binary only. *Author: Les Leist* ➛

by Aimée B. Abren

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TheGuru (FFD #378)

Heee's Baaack! and better than ever. For those of you who miss the Guru, Nico has brought him back in Kickstart 2.0.

Three programs are needed to make the Guru work: TheGuru (the main program), GuruSettings, and GuruEd. GuruSettings allows you to change the speech settings of the Guru: change the volume, rate, pitch, sex, and mode of the speech. GuruEd is the phrase editor where you can display, speak, change, delete and add to all the phrases the Guru speaks.

As you might have guessed, this isn't the Guru we came to know and love, but it's sure a more humorous one. Once loaded, TheGuru will appear after a set time, speak one of the phrases found in the GuruEd, then go away. One good thing about this Guru is he is not an eminent purveyor of bad news. Includes binary only. *Author: Nico Francis*

UPDATES

PPShow V1.2 (FFD #371) shows normal IFF ILBM files, as well as files crunched with the shareware program PowerPacker. PPShow can be run from both the CLI and Workbench. Cycling routines have been rewritten in Assembly so there is less overhead when cycling. Memory wasn't freed when an IFF error occured. This has now been fixed. This is an update to V1.1a. Includes binary only.
Author: Nico Francis.

PPMore V1.7 (FFD #371), written to complement the shareware program PowerPacker, reads ASCII text files just like More, plus read files crunched with PowerPacker. Now system and screen fonts are fully supported and automatically refresh when you resize the window. You can access PPMore through the CLI or Workbench. PPMore V1.7 is an update to V1.6a. Binary only.
Author: Nico Francis

Mat (FFD #374) is a comprehensive String Search/Pattern matching program. It can search for strings or patterns in text files, and examine text files and directories to produce output. Mat is said to be about three times faster than the AmigaDOS SEARCH command. Changes include the fast string search mechanism, file pathname resolution now generates full pathnames, and Mat can be made resident. This is an update to FFD #102. Includes binary only. *Author: Pete Goodeve.*

TextPlus V2.2E (FFD #375) is a simple word processor. Includes all the necessary options to type letters and reports. TextPlus has both German and English versions. Changes from the previous versions include a backup-mode for saving files from overwriting them. Plus the block-operations mark, copy, delete, and delete mark can now be executed with the mouse. This is an update to V2.0 on FFD #339. Includes full source.
Author: Martin Steppler.

BI V1.3 (FFD #375) is a brush-to-image C code generator. BI loads ILBM or brush files and converts them to C code. Loads images in low and high resolutions, hi-res interlaced, and overscan mode. This is an update to V1.0. Includes binary only.
Author: Terry Gintz

CardMaker V2.1 (FFD #375) creates card image data to be used in any card game. This version now supports AmigaBASIC programmers. Card Suits are created with the Suit menu. An empty template is provided for the user to draw his own images. This is an update to V1.0 on FFD #184. Includes binary only. *Author: Terry Gintz*

Multiplot V XLNc (FFD #373) is an intuitive data plotting program with flexible input options. Bug fixes include: 1) Plot dimensions reset now if a plot is redrawn without text; 2) The ZOOM option will no longer crash; and 3) Multiplot now handles greater than 20 data sets. Some new features are that all error reports are displayed with alerts or requesters, the number of X and Y axis tick marks or lines can now be defined independently, and the data file format is checked before loading. This is an update to the original on FFD #333. Includes source. *Authors: Alan Baxter, Tim Mooney, Rich Champeaux, and Jim Miller.*

MuchMore V2.7 (FFD #378) is like More and Less in that it reads ASCII text files. MuchMore opens a window and scrolls the text. It does more than More and Less by displaying four colors, and supporing bold, italic, underline, and inverse. MuchMore also has commands to search for a string and print the text. This is an update to V2.5 on FFD #253. Includes source in Oberon and Assembly code.

•AC•

All programs listed are new additions to the Fred Fish Collections and can be found on disks #371 - #380.

A Shared Library for Matrix Manipulations

by Randy Finch

FOR SOME TIME NOW I HAVE WANTED TO LEARN HOW TO create a shared library for my Amiga. I looked over the *ROM Kernel Manual* (Ref. 1) and at public domain libraries, but to no avail. The problem appeared to be twofold: not enough information, and lack of knowledge of the Amiga's Assembly language. I have, in the past, programmed the Commodore 64 quite a bit in Assembly language. However, 68000 Assembly language appeared to be much more complex than 6502 Assembly language. I was still in the process of learning C and was not inclined to learn 68000 Assembly. Still, I couldn't help thinking that there had to be a simple way to create a shared library—a way even *I* could understand.

Then it happened. The April '89 (V4.4) issue of *Amazing Computing* contained an article by John Baez entitled "Creating a Shared Library" (Ref. 2). Perusing the article and program listings, I began to realize that my suspicions were right: creating a shared library could be easy! As time permitted, I experimented with the code in Baez's article. Once I had it working, I was ready to begin creating my own library.

I decided to first create a Matrix.library which would contain routines for manipulating matrices. There were multiple reasons for this choice. My profession requires me to solve simultaneous equations and calculate least-squares multiple regression coefficients. Although I typically use commercial software for these tasks, I knew the calculations were based on matrices and I wanted to learn more about the math behind the calculations. Also, I was personally working on a three-dimensional function plotting program. Two- and three-dimensional vector translation, rotation, and scaling are also based on matrix manipulation. A shared library should only be created if a variety of programs can use it. Matrix.library meets this criterion.

As I began to create Matrix.library, I realized that some improvements could be made to Baez's code because I had Lattice version 5.04, a great improvement over the version 4 that Baez used in his article. Therefore, this article has three purposes altogether: 1) Present the source code for Matrix.library as well as an exhaustive test program, 2) Point out some improvements over Baez's code due to improvements in the Lattice development system, and 3) Present several programs that illustrate how the library can be put to practical use.

REVEALING MY SOURCE

Unlike most newspaper reporters, many software developers like to reveal their source. That is exactly what I am prepared to do. Matrix.library consists of four files, shown in Listings One through Four. Listing One is MatrixLib.a. The only Assembly language file, it consists of the standard shared library header data and the interface routines for the standard and user library functions that are written in C. Listing Two is Matrix.c. It contains all the code for both the standard and the user functions. Listing Three is Matrix.fd. This is the standard file description text that provides information about which microprocessor registers are to be used for passing parameters to the library user functions. Listing Four is MatrixProto.h, a C header file containing the user function prototypes.

Listing Five is Test.h, a header file that #includes several other header files and contains vector and matrix display functions. It is used by several of the programs presented in this article. Listing Six shows a makefile that can be used with LMK (Lattice Make Utility) to create Matrix.library and other programs presented later.

A COMPARISON

I do not intend to detail the inner workings of MatrixLib.a. Other than the XREF statements and jump vectors near the beginning of the file and the interface stub routines at the end of the file, it is essentially the same as slibh.a in Baez's article. I do wish to point out some changes I made to Baez's code, so dig out your April '89 issue of *Amazing Computing*, place it alongside this article, and follow through the upcoming discussion. I have numbered the lines in MatrixLib.a to make the discussion easier to follow.

Lines 27-53 are the user function XREF statements that allow the C functions in Matrix.c to be visible during linking. There are 25 user functions in Matrix.library. They will be discussed in more detail later. As more functions are added to the library, more XREF statements need to be added to this list. Also, new jmp statements will need to be added to the jump vector list in lines 94-120. It is important to remember that the jump vectors *must* be in reverse order of the function list in Matrix.fd. The jump table in MatrixLib.a uses the jmp instruction, whereas Baez used a hard coded $4EF9 (long jump) due to a bug in the assembler he was using.

In lines 151 and 157, I describe the size of the jump vector table and data section in terms of the difference of two labels rather than hard coding the sizes. This allows additional functions (and thus more jmp instructions) and new data to be added without having to worry about changing these numbers.

Lines 237-408 contain the interface stub routines for all of the user functions in Matrix.library. These routines simply move the appropriate registers onto the stack and call the C functions in Matrix.c. One thing to keep in mind is that the addq.l instruction can only be used for a value of eight or less. Since each parameter requires the stack to be adjusted by four, addq.l can only be used when two or fewer parameters are passed. For more parameters, add.l must be used. It is very important that the registers placed on the stack match the registers declared in Matrix.fd because the compiler will be placing the parameters in the registers according to the .fd file. Lattice version 4 only supported four parameters in the #pragma statements (produced from the .fd file using fd2pragma). However, Lattice version 5 supports six parameters. This extra support came in the nick of time as Matrix.library has two functions that pass this many parameters.

Baez's comments near the end of slibh.a state that Lattice is fuzzy (could he mean fussy?) about not having its own startup code during linking, and provides a piece of code starting with SECTION _MERGED that contains some XREFs and data labels. None of this is needed for Lattice version 5.04 and beyond; blink now behaves just fine.

TABLE ONE: Summary of User Functions in Matrix.library

1. AllocLVector/AllocDVector (numels)

   Allocates memory for a vector containing numels elements and returns a pointer to the memory space.

2. AllocLMatrix/AllocDMatrix (numrows, numcols)

   Allocates memory for a matrix with numrows rows and numcols columns and returns a pointer to a vector of row pointers.

3. FreeLVector/FreeDVector (v, numels)

   Frees the memory allocated by AllocLVector or AllocDVector where v is the pointer returned by these functions, and numels is the number of elements in the vector. Returns either TRUE or FALSE.

4. FreeLMatrix/FreeDMatrix (m, numrows, numcols)

   Frees the memory allocated by AllocLMatrix of AllocDMatrix where m is the pointer returned by these functions, numrows is the number of rows in the matrix, and numcols is the number of columns in the vector. Returns either TRUE or FALSE.

5. AddLVectors/AddDVectors (v1, v2, vr, numels)

   Adds the numels elements of vectors v1 and v2 from v1 and puts the results in vector vr. If vr is NULL, it is allocated. Returns vr.

6. SubLVectors/SubDVectors (v1, v2, vr, numels)

   Subtracts the numels elements of vector v2 from v1 and puts the results in vector vr. If vr is NULL, it is allocated. Returns vr.

7. AddLMatrices/AddDVectors (m1, m2, mr, numrows, numcols)

   Adds the numrows*numcols elements of matrices m1 and m2 and puts the results in matrix mr. If mr is NULL, it is allocated. Returns mr.

LOOKING THROUGH THE LIBRARY

Let's take a look at the functions that are a part of Matrix.c. The standard library functions CInit(), LibOpen(), LibClose(), and LibExpunge() are the same as Baez's except CInit(). Some of the user functions in Matrix.c use floating point calculations. Mathieeedoubbas.library is used for these calculations. Therefore, this library must be opened in CInit(). If it fails to open, a NULL is returned to inform Exec that Matrix.library failed to initialize.

The user functions in Matrix.library are divided into two categories: long integer functions and double precision floating point functions. The former handle the manipulation of matrices containing integers, while the latter handle the manipulation of matrices containing floating point numbers. There are a total of 25 user functions in Matrix.library: 12 for integer matrices and 13 for floating point matrices. A matrix with only one row or column is also known as a vector. Some functions

8. SubLMatrices/SubDMatrices (m1, m2, mr, numrows, numcols)

   Subtracts the numrows*numcols elements of matrix m2 from m1 and puts the results in matrix mr. It mr is NULL, it is allocated. Returns mr.

9. MultLMatrices/MultDMatrices (m1, m2, mr, numrows1, numcols1, numcols2)

   Multiplies matrix m1 with numrows1 rows and numcols1 columns and matrix m2 with numcols1 rows and numcols2 columns (e.g., m1*m2). The result is placed in matrix mr with numrows1 rows and numcols2 columns. If mr is NULL, it is allocated. Returns mr.

10. MultLVectorMatrix/MultDVectorMatrix
    (v, m, vr, numels, numcols)

    Multiplies vector v with numels elements and matrix m with numels rows and numcols columns (e.g., v*m). The result is placed in vector vr with numcols elements. The order of multiplication implies that v and vr are both row vectors. If vr is NULL, it is allocated. Returns vr.

11. MultLMatrixVector/MultDMatrixVector
    (m, v, vr, numrows, numels)

    Multiplies matrix m with numrows rows and numels columns and vector v withnumels elements (e.g., m*v). The result is placed in vector vr with numrows elements. The order of multiplication implies that v and vr are both column vectors. If vr is NULL, it is allocated. Returns vr.

12. TransposeLMatrix/TransposeDMatrix (m, mt, numrows, numcols)

    Transposes matrix m with numrows rows and numcols columns. The result is placed in mt with numcols rows and numrows columns. If mt is NULL, it is allocated. Returns mt.

13. InvertDMatrix (m, mcopy, mi, numrows)

    Inverts a square matrix m with numrows rows and columns and puts the result inmatrix mi with numrows rows and columns. mcopy is a duplicate of m. If it is passed to the function as NULL, InvertDMatrix will allocate it, copy m to it, use it for the inverse calculations (it is destroyed in the process), and then deallocate it. Also, if mi is passed to the function as NULL, InvertDMatrix will allocate it. This function is not implemented for long integers because it is highly unlikely that a long integer matrix will have an inverse that is composed of all integers.

are written specifically with vectors in mind, while other functions are written for matrices in general. Table One shows a list of the user functions and describes the tasks performed by each. The letter "L" in a function name indicates that it is a long integer function; the letter "D" indicates a double precision floating point function.

The code for the memory allocation and deallocation functions and the matrix inversion function were based on similar functions included in the book *Numerical Recipes in C* (Ref. 3). This book contains a world of algorithms for mathematical problems. I highly recommend it to anyone writing mathematical software.

Most of the code in Matrix.c is straightforward and requires no explanation. However, there are a few items that need to be mentioned. When a vector is allocated, a pointer to the allocated memory space is returned to the calling program. This pointer can be used just like a standard C array pointer. However, when a matrix is allocated, the pointer that is returned to the calling program points to an array of pointers, each of which points to an array of numbers that represent the rows of the matrix. Thus, to refer to an individual element of the matrix, the standard C notation for a two-dimensional array, m[row][column], cannot be used. Rather, the element must be referred to as (m[row])[column]. In *Numerical Recipes in C*, Press, et.al. state that the standard notation can be used; however, it does not work with the Lattice compiler.

The method used for inverting a matrix in InvertDMatrix() is called LU decomposition. The explanation of how it works is rather lengthy so, if you are interested in this method, I refer you to *Numerical Recipes in C*.

TESTING THE LIBRARY

Listing Seven shows the C source of a program entitled TestMatLib.c. This program opens Matrix.library, allocates several vectors and matrices, and assigns random numbers to the elements. It then calls every function in Matrix.library. The input vectors and matrices, as well as the result vectors and matrices, are printed to the standard output each step of the way. When the test is complete, all the vectors and matrices are deallocated and Matrix.library is closed. A sample output of the program is shown in Listing Eight.

Well, let's call it quits for now. In the second part of this article, we'll look at how to make practical use of the matrix.library.

Listings One through Eight follow.

References

1. Commodore-Amiga, Inc., *Amiga ROM Kernel Reference Manual: Includes and Autodocs*, Addison-Wesley Publishing, 1989.

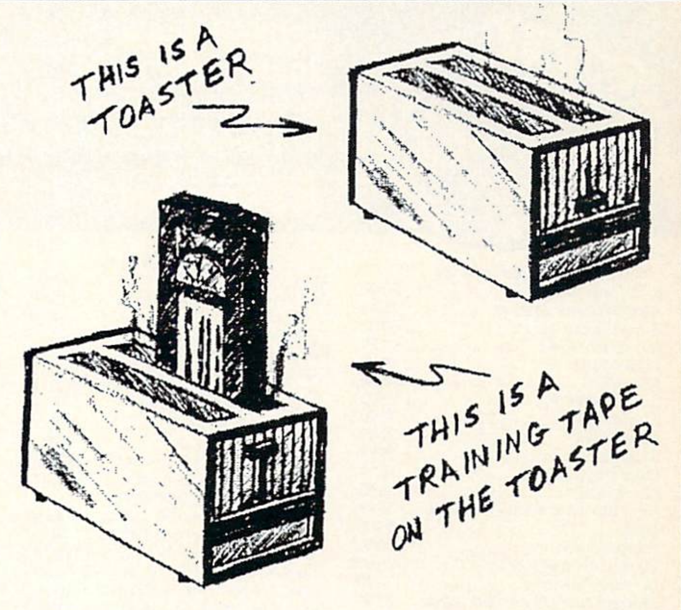
2. Baez, J., "Creating Shared Libraries", *Amazing Computing for the Commodore Amiga*, PiM Publications, Inc., April 1989 (V4.4).

3. Press, W. H., Flannery, B.P., Teukolsky, S. A., and Vetterling, W. T., *Numerical Recipes in C: The Art of Scientific Computing*, Cambridge University Press, 1988.

LISTING 1 - Assembly Portion of Matrix.library

```
;
; MatrixLib.a - shared library assembly header
;
; Contains the Resident and Library structures, jump vector
; table, user data, and function stub routines
;
; This code is FREELY DISTRIBUTABLE but NOT PUBLIC DOMAIN
; (Written by Randy Finch)
;

VERSION     equ     1
REVISION    equ     0

      CSECT text

      XDEF  _LibName,_LibID,_SysBase,_MathIeeeDoubBasBase

; Library C functions to be accessed from assembly

      XREF  _CInit
      XREF  _LibOpen
      XREF  _LibClose
      XREF  _LibExpunge

; User C functions to be accessed from assembly

      XREF  _AllocLVector
      XREF  _AllocLMatrix
      XREF  _FreeLVector
      XREF  _FreeLMatrix
      XREF  _AddLVectors
      XREF  _SubLVectors
      XREF  _AddLMatrices
      XREF  _SubLMatrices
      XREF  _MultLMatrices
      XREF  _MultLVectorMatrix
      XREF  _MultLMatrixVector
      XREF  _TransposeLMatrix

      XREF  _AllocDVector
      XREF  _AllocDMatrix
      XREF  _FreeDVector
      XREF  _FreeDMatrix
      XREF  _AddDVectors
      XREF  _SubDVectors
      XREF  _AddDMatrices
      XREF  _SubDMatrices
      XREF  _MultDMatrices
      XREF  _MultDVectorMatrix
      XREF  _MultDMatrixVector
      XREF  _TransposeDMatrix

      XREF  _InvertDMatrix     ;no equivalent for LONG
                               ;for obvious reasons


; In case we are executed as a program

Start:      clr.l   D0
            rts

; romtag (or Resident) structure -
;     Exec looks for $4AFC followed by a pointer to it near the
;           beginning of load point.
;     Lets Exec know how to set up library.

InitDesc:   dc.w    $4AFC     ;RTC_MATCHWORD
            dc.l    InitDesc  ;Pointer to beginning
            dc.l    EndCode   ;Not sure it matters
            dc.b    0         ;flags (NO RTF_AUTOINIT)
            dc.b    VERSION   ;version
            dc.b    9         ;NT_LIBRARY
            dc.b    0         ;priority (doesn't matter)
            dc.l    _LibName  ;Name of library (given below)
            dc.l    _LibID   ;ID string (note CR-LF at end below)
            dc.l    Init      ;Pointer to init routine

_LibName:   dc.b    "Matrix.library",0
_LibID:     dc.b    "Matrix.library 1.00 (21 Jan 1990)",13,10,0

; Force word alignment

            ds.w    0

; Here is the function list or jump vectors.If you use
; MakeLibrary() this is not needed, but a table of vectors
; must be passed to MakeLibrary() which allocates space for the
; jump vectors.

Funcs:

; First the user functions - reverse order from .fd file

      jmp  AInvertDMatrix     ;no equivalent for LONG

      jmp  ATransposeDMatrix
      jmp  AMultDMatrixVector
      jmp  AMultDVectorMatrix
      jmp  AMultDMatrices
      jmp  ASubDMatrices
      jmp  AAddDMatrices
      jmp  ASubDVectors
      jmp  AAddDVectors
      jmp  AFreeDMatrix
      jmp  AFreeDVector
      jmp  AAllocDMatrix
      jmp  AAllocDVector

      jmp  ATransposeLMatrix
      jmp  AMultLMatrixVector
      jmp  AMultLVectorMatrix
      jmp  AMultLMatrices
      jmp  ASubLMatrices
      jmp  AAddLMatrices
      jmp  ASubLVectors
      jmp  AAddLVectors
      jmp  AFreeLMatrix
      jmp  AFreeLVector
      jmp  AAllocLMatrix
      jmp  AAllocLVector

; System functions are always here in this order

      jmp       ALibReserved   ;Not used at this time
      jmp       ALibExpunge    ;For removing library
      jmp       ALibClose      ;Guess what? Close the library
      jmp       ALibOpen       ;Right again! Open the library

; Here is the Library structure.  Must be at this location, just
; after the jump vectors.  This must be initialized if not using
; MakeLibrary().

Lib:

; First five items make up the Node structure which is the first
;  data item in the Library structure.

      dc.l      0              ;ln_Succ  (next node)
      dc.l      0              ;ln_Pred  (previous node)
      dc.b      9              ;ln_Type  (NT_LIBRARY)
      dc.b      0              ;ln_Pri   (priority)
      dc.l      _LibName       ;ln_Name  (Library name)

; The next 9 items make up the remainder of the Library structure

      dc.b      6              ;lib_Flags (LIBF_CHANGED | LIBF_SUMUSED
      dc.b      0              ;lib_pad

; The next value will change when the # of user functions change.

      dc.w      Lib-Funcs    ;lib_NegSize (size of jump vectors)
                             ; (6 bytes per vector)

; Next value will change when the # of user data items change.
; Value is (Library structure size)+(User data size) = 34+User.

      dc.w      EndData-Lib ;lib_PosSize (size of data)

      dc.w      VERSION      ;lib_Version
      dc.w      REVISION     ;lib_Revision
      dc.l      _LibID       ;lib_IdString
      dc.l      0            ;lib_Sum  (the checksum)
      dc.w      0            ;lib_OpenCnt (number of opens on lib)

; User data can be placed here. If you are using C, only the data
; needed in assembly code needed here. Make sure all user data
; appears before the EndData label so lib_PosSize is correct.

_seglist:                   dc.l    0
_SysBase:                   dc.l    0
_MathIeeeDoubBasBase:       dc.l    0

; EndData label only used for data size in lib_PosSize above

EndData:

; Initialization routine -
; This is only called once - when the library is first loaded.
; Exec passes the load point or seglist of the library in A0.
; Since we are not auto init, the Library structure pointer,
; Lib, must be passed to C routine so AddLibrary() can be called.

Init:         move.l    A6,_SysBase ;Save A6 (SysBase)
              move.l    A0,_seglist ;Save segment list
              lea       Lib,A1       ;Bring in Library base
              move.l    A1,-(sp)     ;Put Library base on stack
              jsr       _CInit       ;Call our C init routine
              addq.l    #4,sp        ;Reset the stack pointer
              rts

; Open routine -
;  This is called each time an application opens the library.
;  Just set up stack here and call the C routine.

ALibOpen:   move.l  D0,-(sp)       ;Put version number on the stack
            move.l  A6,-(sp)       ;Put Library base on stack
            jsr     _LibOpen       ;Call our C routine
            addq.l  #8,sp          ;Adjust the stack
            rts

; Close routine -
;  This is called each time an application closes the library.
;  Again, just set up stack and call the C routine.

ALibClose:  move.l  A6,-(sp)       ;Put Library base on stack
            jsr     _LibClose      ;Call our C routine
            addq.l  #4,sp          ;Adjust the stack
            rts

; Expunge routine -
; When all applications that opened the library have also closed
; the library, this routine is called to clean up and unload the.
; library Again, set up stack and call the C routine.
```

```

ALibExpunge:
        move.l  A6,-(sp)        ;Put Library base on stack
        jsr     _LibExpunge     ;Call our C routine
        addq.l  #4,sp           ;Adjust the stack
        rts

; This is a reserved routine and not used at this time.

ALibReserved:
        clr.l   0
        rts

; User routines - Again these are used to set up
; the stack to call our C = functions. When the routines are
; called, the arguments will be in registers. These arguments
; must be put on the stack before executing the C function.
; The stack will be adjusted by 4 for each argument after
; returning from the C function.Arguments are placed on the
; stack from right to left.

; Here are the setup routines for the LONG functions

AAllocLVector:
        move.l  D0,-(sp)
        jsr     _AllocLVector
        addq.l  #4,sp
        rts

AAllocLMatrix:
        movem.l D0-D1,-(sp)
        jsr     _AllocLMatrix
        addq.l  #8,sp
        rts

AFreeLVector:
        move.l  D0,-(sp)
        move.l  A0,-(sp)
        jsr     _FreeLVector
        addq.l  #8,sp
        rts

AFreeLMatrix:
        movem.l D0-D1,-(sp)
        move.l  A0,-(sp)
        jsr     _FreeLMatrix
        add.l   #12,sp
        rts

AAddLVectors:
        move.l  D0,-(sp)
        movem.l A0-A2,-(sp)
        jsr     _AddLVectors
        add.l   #16,sp
        rts

ASubLVectors:
        move.l  D0,-(sp)
        movem.l A0-A2,-(sp)
        jsr     _SubLVectors
        add.l   #16,sp
        rts

AAddLMatrices:
        movem.l D0-D1,-(sp)
        movem.l A0-A2,-(sp)
        jsr     _AddLMatrices
        add.l   #20,sp
        rts

ASubLMatrices:
        movem.l D0-D1,-(sp)
        movem.l A0-A2,-(sp)
        jsr     _SubLMatrices
        add.l   #20,sp
        rts

AMultLMatrices:
        movem.l D0-D2,-(sp)
        movem.l A0-A2,-(sp)
        jsr     _MultLMatrices
        add.l   #24,sp
        rts

AMultLVectorMatrix:
        movem.l D0-D1,-(sp)
        movem.l A0-A2,-(sp)
        jsr     _MultLVectorMatrix
        add.l   #20,sp
        rts

AMultLMatrixVector:
        movem.l D0-D1,-(sp)
        movem.l A0-A2,-(sp)
        jsr     _MultLMatrixVector
        add.l   #20,sp
        rts

ATransposeLMatrix:
        movem.l D0-D1,-(sp)
        movem.l A0-A1,-(sp)
        jsr     _TransposeLMatrix
        add.l   #16,sp
        rts

; Here are the setup routines for the DOUBLE functions

AAllocDVector:
        movem.l D0,-(sp)
        jsr     _AllocDVector
        addq.l  #4,sp
        rts

AAllocDMatrix:
        movem.l D0-D1,-(sp)
        jsr     _AllocDMatrix
        addq.l  #8,sp
        rts

AFreeDVector:
        move.l  D0,-(sp)
        move.l  A0,-(sp)
        jsr     _FreeDVector
        addq.l  #8,sp
        rts

AFreeDMatrix:
        movem.l D0-D1,-(sp)
        move.l  A0,-(sp)
        jsr     _FreeDMatrix
        add.l   #12,sp
        rts

AAddDVectors:
        move.l  D0,-(sp)
        movem.l A0-A2,-(sp)
        jsr     _AddDVectors
        add.l   #16,sp
        rts

ASubDVectors:
        move.l  D0,-(sp)
        movem.l A0-A2,-(sp)
        jsr     _SubDVectors
        add.l   #16,sp
        rts

AAddDMatrices:
        movem.l D0-D1,-(sp)
        movem.l A0-A2,-(sp)
        jsr     _AddDMatrices
        add.l   #20,sp
        rts

ASubDMatrices:
```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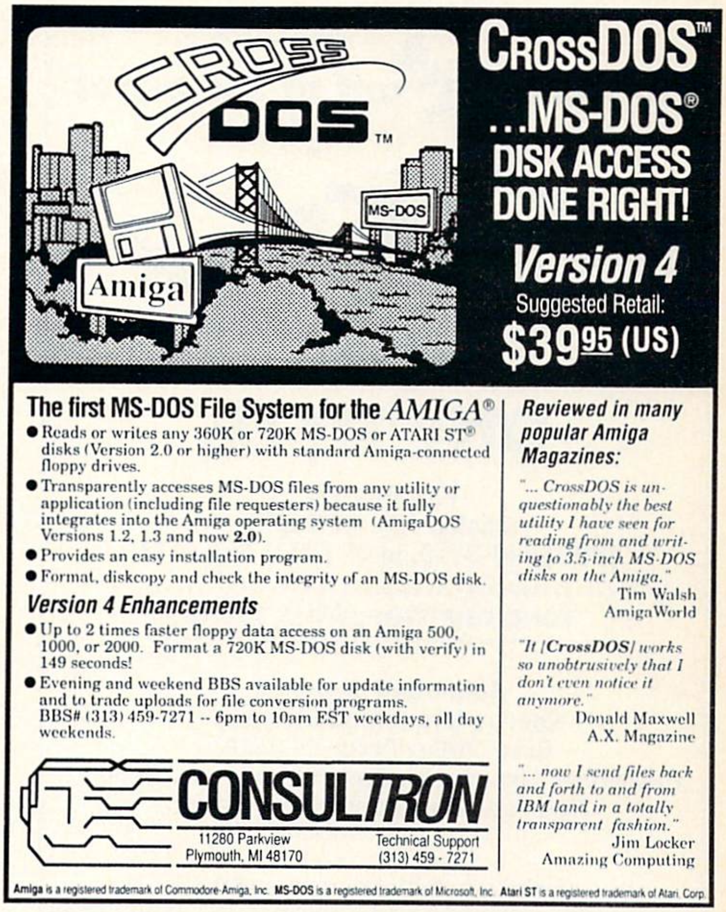
```
        movem.l  D0-D1,-(sp)
        movem.l  A0-A2,-(sp)
        jsr      _SubDMatrices
        add.l    #20,sp
        rts

AMultDMatrices:
        movem.l  D0-D2,-(sp)
        movem.l  A0-A2,-(sp)
        jsr      _MultDMatrices
        add.l    #24,sp
        rts

AMultDVectorMatrix:
        movem.l  D0-D1,-(sp)
        movem.l  A0-A2,-(sp)
        jsr      _MultDVectorMatrix
        add.l    #20,sp
        rts

AMultDMatrixVector:
        movem.l  D0-D1,-(sp)
        movem.l  A0-A2,-(sp)
        jsr      _MultDMatrixVector
        add.l    #20,sp
        rts

ATransposeDMatrix:
        movem.l  D0-D1,-(sp)
        movem.l  A0-A1,-(sp)
        jsr      _TransposeDMatrix
        add.l    #16,sp
        rts

AInvertDMatrix:
        move.l   D0,-(sp)
        movem.l  A0-A2,-(sp)
        jsr      _InvertDMatrix
        add.l    #16,sp
        rts

EndCode:
        END
```

LISTING 2 - Matrix.library Functions in C

```
/*
 *  Matrix.c
 *  Contains the standard library and user functions
 *  for Matrix.library
 *
 *  This code is FREELY DISTRIBUTABLE but NOT PUBLIC DOMAIN.
 *   (Written by Randy Finch)
 */

#include <exec/types.h>
#include <exec/libraries.h>
#include <exec/memory.h>
#include <libraries/dos.h>
#include <proto/exec.h>
#include <stdlib.h>
#include <mieeedoub.h>

/* Useful definitions for allocating vectors and matrices */

#define ChkLVector(v,els) \
        {if(!v) { v = AllocLVector(els); if(!v) return NULL; } }
#define ChkDVector(v,els) \
        {if(!v) { v = AllocDVector(els); if(!v) return NULL; } }
#define ChkLMatrix(m,rows,cols) \
        {if(!m) { m = AllocLMatrix(rows,cols); if(!m) return NULL; } }
#define ChkDMatrix(m,rows,cols) \
        {if(!m) { m = AllocDMatrix(rows,cols); if(!m) return NULL; } }

/*   The Extended Library structure is equivalent to the one in MatrixLib.a. Since a
pointer is passed from assembly to the C routines, the same data can be manipulated
from C or assembly.Make sure the two structures are EQUIVALENT!!!   */

typedef struct Library    LIB;

struct ExtLibrary {
   LIB lib;

   /* User data can go here */

   LONG seglist;
   LONG SysBase;
   LIB *MathIeeeDoubBasBase;
};

typedef struct ExtLibrary ELIB;

extern LIB *MathIeeeDoubBasBase;

#define VERSION     1
#define REVISION    0

/*
 *    The Initialization routine is given only the library pointer.
 *    Since we are NOT AUTOINIT we must add the library ourself
 *    and return the library pointer.  Exec has Forbid()
 *    for us during the call.
 */

ELIB *CInit(lib)
   ELIB *lib;
{
   /* Here is where other libraries are opened and internal data
      structures are initialized */

   MathIeeeDoubBasBase = OpenLibrary("mathieeedoubbas.library",0L);
   if(!MathIeeeDoubBasBase)  return (ELIB *)NULL;
   lib->MathIeeeDoubBasBase = MathIeeeDoubBasBase;

   AddLibrary((LIB *)lib);  /* Add ourself because we are not auto init*/
   return(lib);
}

/*
 *    Open is given the library pointer and the version request.  Either
 *    return the library pointer or NULL.Remove the DELAYED-EXPUNGE
 *    flag. OpenLibrary() will check the version for us; we do not need
 *    to check. Exec has Forbid() for us during the call.
 */

ELIB *LibOpen(lib,version)
   ELIB *lib;
   long version;
{
   ++(lib->lib.lib_OpenCnt);
   lib->lib.lib_Flags &= ~LIBF_DELEXP;

   /* Here is where you can do whatever is needed each time the library
      is opened. */

   return(lib);
}

/*
 *    Close is given the library pointer.  Be sure
 *    not to decrement the open count if already zero.  If the open
 *    count is or becomes zero AND there is a LIBF_DELEXP, we expunge
 *    the library and return the seglist.  Otherwise we return NULL.
 *
 *    Note that this routine never sets LIBF_DELEXP on its own.
 *
 *    Exec has Forbid() for us during the call.
 */

LibClose(lib)
   ELIB *lib;
```

```
{
   if (lib->lib.lib_OpenCnt) {
      -(lib->lib.lib_OpenCnt);
      return(NULL);
   }

   if (lib->lib.lib_Flags & LIBF_DELEXP)
      return(LibExpunge(lib));

   return(NULL);
}

/*
 *    We expunge the library and return the Seglist ONLY if the open
 *   count is zero.  If the open count is not zero we set the DELAYED-
 *    EXPUNGE flag and return NULL.
 *
 *    Exec has Forbid() for us during the call.  NOTE ALSO that Expunge
 *    might be called from the memory allocator and thus we CANNOT DO A
 *    Wait() or otherwise take a long time to complete (straight from
 *    RKM)
 *
 *    Apparently RemLibrary(lib) calls our expunge routine and would
 *    therefore freeze if we called it ourselves.  It appears that
 *    LibExpunge(lib) must remove the library itself as shown below.
 */

LibExpunge(lib)
   ELIB *lib;
{
   long seg;

   if (lib->lib.lib_OpenCnt) {
      lib->lib.lib_Flags |= LIBF_DELEXP;
      return(NULL);
   }

   /* Clean up yourself here */

   CloseLibrary(MathIeeeDoubBasBase);
   seg = lib->seglist;
   Remove((struct Node *)lib);
   return(seg);
}

/*———————————————————————————————————————*/

         /* And now it is time to put in the USER FUNCTIONS */

/*———————————————————————————————————————*/

/*—————————————————————————
      Routines for LONG INTEGER vectors and matrices
———————————————————————————*/

/* Allocate a long integer vector with numels number of elements */

LONG *AllocLVector(numels)
   LONG numels;
{
   LONG *v;

   if (numels <= 0L) return NULL;/* Number of elements must be > zero */

   v = (LONG *)AllocMem(numels*sizeof(LONG),MEMF_CLEAR);

   return v;  /* v will be NULL if allocation failed */

} /* AllocLVector */

/* Allocate a long integer matrix */

LONG **AllocLMatrix (numrows, numcols)
   LONG numrows, numcols;
{
   LONG i, j;
   LONG **m;

   /* Number of rows and columns must be > zero */
   if ( (numrows <= 0L) || (numcols <= 0L) )  return NULL;

   /* Allocate row pointers */
   m = (LONG **)AllocMem(numrows*sizeof(LONG *),MEMF_CLEAR);
   if (!m)  return NULL;   /* allocation failed */

   /* Allocate row vectors and equate row pointers to them */
   for (i=0L ; i<numrows ; i++) {
      m[i] = (LONG *)AllocMem(numcols*sizeof(LONG),MEMF_CLEAR);
      if (!m[i]) {
         for (j=0L ; j<i ; j++) {
            FreeMem((void *)m[j],numcols*sizeof(LONG));
         }
         FreeMem((void *)m, numrows*sizeof(LONG *));
         return NULL;  /* allocation failed */
      } /* if */
   } /* for */

   return m;

} /* AllocLMatrix */

/* Free a long integer vector */

BOOL FreeLVector(v, numels)
   LONG *v, numels;
{
   /* Make sure pointer is not NULL and numels is non-zero */
   if (v && numels) {
      FreeMem((void *)v, numels*sizeof(LONG));
      return TRUE;
   }

   return FALSE;

} /* FreeLVector */

/* Free a long integer matrix */

BOOL FreeLMatrix (m, numrows, numcols)
   LONG **m;
   LONG numrows, numcols;
{
   LONG i;

/* Make sure pointer is not NULL and numrows and numcols are non-zero */
   if (m && numrows && numcols) {
      for (i=numrows-1 ; i>=0L ; i-) {
         FreeMem((void *)m[i], numcols*sizeof(LONG));/* Free elements */
      }
      FreeMem((void *)m, numrows*sizeof(LONG *));/* Free row pointers */
      return TRUE;
   }

   return FALSE;

} /* FreeLMatrix () */

/* Add two long integer vectors */

LONG *AddLVectors (v1, v2, vr, numels)
   LONG *v1, *v2, *vr;
   LONG numels;
{
   LONG i;

   ChkLVector(vr,numels);
   for (i=0L ; i<numels ; i++) {
      vr[i] = v1[i] + v2[i];
   } /* for */
   return vr;

} /* AddLVectors () */

/* Subtract two long integer vectors */

LONG *SubLVectors (v1, v2, vr, numels)
   LONG *v1, *v2, *vr;
```



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```
   LONG numels;
{
   LONG i;

   ChkLVector(vr,numels);
   for (i=0L ; i<numels ; i++) {
      vr[i] = v1[i] - v2[i];
   } /* for */
   return vr;

} /* SubLVectors () */

/* Add two long integer matrices */

LONG **AddLMatrices (m1, m2 , mr, numrows, numcols)
   LONG **m1, **m2, **mr;
   LONG numrows, numcols;
{
   LONG i, j;

   ChkLMatrix(mr,numrows,numcols);
   for (i=0L ; i<numrows ; i++) {
      for (j=0L ; j<numcols ; j++) {
         (mr[i])[j] = (m1[i])[j] + (m2[i])[j];
      } /* for j */
   } /* for i */
   return mr;

} /* AddLMatrices () */

/* Subtract two long integer matrices */

LONG **SubLMatrices (m1, m2 , mr, numrows, numcols)
   LONG **m1, **m2, **mr;
   LONG numrows, numcols;
{
   LONG i, j;

   ChkLMatrix(mr,numrows,numcols);
   for (i=0L ; i<numrows ; i++) {
      for (j=0L ; j<numcols ; j++) {
         (mr[i])[j] = (m1[i])[j] - (m2[i])[j];
      } /* for j */
   } /* for i */
   return mr;

} /* SubLMatrices () */
```

```
LONG **MultLMatrices(m1, m2, mr, numrows1, numcols1, numcols2)
   LONG **m1, **m2, **mr;
   LONG numrows1, numcols1, numcols2;
{
   LONG row1, col1, row2, col2;
   LONG numrows2;

   numrows2 = numcols1;  /* This MUST be true for multiplication */

   ChkLMatrix(mr,numrows1,numcols2);
   for (row1=0L ; row1<numrows1 ; row1++) {
      for (col2=0L ; col2<numcols2 ; col2++) {
         /* Initialize in case mr has non-zero elements */
         (mr[row1])[col2] = 0;
         for (col1=0L,row2=0L ; (col1<numcols1)&&(row2<numrows2) ;
               col1++,row2++) {
            (mr[row1])[col2] += (m1[row1])[col1] * (m2[row2])[col2];
         } /* for */
      } /* for */
   } /* for */
   return mr;

} /* MultLMatrices */

LONG *MultLVectorMatrix(v, m, vr, numels, numcols)
   LONG *v, **m, *vr;
   LONG numels, numcols; /* Elements in vector, columns in matrix */
{
   LONG mrow, mcol, vcol;
   LONG numrows;

   /* This function calculates v*m, thus v MUST be a ROW VECTOR */

   numrows = numels;  /* This MUST be true for multiplication */

   ChkLVector(vr,numcols);
   for (mcol=0L ; mcol<numcols ; mcol++) {
      /* Initialize in case vr has non-zero elements */
      vr[mcol] = 0;
      for (vcol=0L,mrow=0L ; vcol<numels ; vcol++,mrow++) {
         vr[mcol] += v[vcol] * (m[mrow])[mcol];
      } /* for */
   } /* for */
   return vr;

} /* MultLVectorMatrix */

LONG *MultLMatrixVector(m, v, vr, numrows, numels)
   LONG *v, **m, *vr;
   LONG numels, numrows; /* Elements in vector, rows in matrix */
{
   LONG mrow, mcol, vrow;
   LONG numcols;

   /* This function calculates m*v, thus v MUST be a COLUMN VECTOR */

   numcols = numels;  /* This MUST be true for multiplication */

   ChkLVector(vr,numrows);
   for (mrow=0L ; mrow<numrows ; mrow++) {
      /* Initialize in case vr has non-zero elements */
      vr[mrow] = 0;
      for (vrow=0L,mcol=0L ; vrow<numels ; vrow++,mcol++) {
         vr[mrow] += (m[mrow])[mcol] * v[vrow];
      } /* for */
   } /* for */
   return vr;

} /* MultLMatrixVector */

LONG **TransposeLMatrix(LONG **m, LONG **mt, LONG numrows, LONG numcols)
   /*    m is the matrix to be transposed
         mt is the transposed matrix
         numrows is number of rows in m
         numcols is number of columns in m
   */
{
   LONG i, j;

   /* If mt is NULL, client wants us to allocate.
      Notice that the number of rows and columns are reversed. */

   ChkLMatrix(mt,numcols,numrows);

   /* Transpose the matrix */
   for (i=0 ; i<numrows ; i++) {
      for (j=0 ; j<numcols ; j++) {
         (mt[j])[i] = (m[i])[j];
      }
   }
   return mt;

}  /* TransposeLMatrix */

/*-----------------------------
     Routines for DOUBLE vectors and matrices
-------------------------------*/

/* Allocate a double vector with numels number of elements */

DOUBLE *AllocDVector(numels)
   LONG numels;
{
   DOUBLE *v;

   if (numels <= 0L) return NULL;/* Number of elements must be > zero */

   v = (DOUBLE *)AllocMem(numels*sizeof(DOUBLE),MEMF_CLEAR);
   return v;  /* v will be NULL if allocation failed */

} /* AllocDVector */

/* Allocate a double matrix */
DOUBLE **AllocDMatrix (numrows, numcols)
   LONG numrows, numcols;
{
   LONG i, j;
   DOUBLE **m;

   /* Number of rows and columns must be > zero */
   if ( (numrows == 0L) || (numcols == 0L) )  return NULL;

   /* Allocate row pointers */
   m = (DOUBLE **)AllocMem(numrows*sizeof(DOUBLE *),MEMF_CLEAR);
   if (!m)  return NULL;   /* AllocMem failed */

   /* Allocate row vectors and equate row pointers to them */
   for (i=0L ; i<numrows ; i++) {
      m[i] = (DOUBLE *)AllocMem(numcols*sizeof(DOUBLE),MEMF_CLEAR).
      if (!m[i]) {
         for (j=0L ; j<i ; j++) {
            FreeMem((void *)m[j], numcols*sizeof(DOUBLE));
         }
         FreeMem((void *)m,numrows*sizeof(DOUBLE *));
         return NULL;  /* AllocMem failed */
      } /* if */
   } /* for */

   return m;

} /* AllocDMatrix */

/* Free a double vector */
BOOL FreeDVector(v,numels)
   DOUBLE *v;
   LONG   numels;
{

   /* Make sure pointer is not NULL and numels is non-zero */
   if (v && numels) {
      FreeMem((void *)v,numels*sizeof(DOUBLE));
      return TRUE;
   }

   return FALSE;

} /* FreeDVector */

/* Free a double matrix */
BOOL FreeDMatrix (m, numrows, numcols)
   DOUBLE **m;
   LONG numrows, numcols;
{
   LONG i;

/* Make sure pointer is not NULL and numrows and numcols are non-zero */

   if (m && numrows && numcols) {
      for (i=numrows-1 ; i>=0L ; i-) {
         FreeMem((void *)m[i], numcols*sizeof(DOUBLE)); /* Free elements */
      }
      FreeMem ((void *)m, numrows*sizeof(DOUBLE *));  /* Free row pointers */
      return TRUE;
   }

   return FALSE;

} /* FreeDMatrix () */

/* Add two double vectors */
DOUBLE *AddDVectors (v1, v2, vr, numels)
   DOUBLE *v1, *v2, *vr;
   LONG numels;
{
   LONG i;

   ChkDVector(vr,numels);
   for (i=0L ; i<numels ; i++) {
      vr[i] = v1[i] + v2[i];
   } /* for */
   return vr;

} /* AddDVectors () */

/* Subtract two double vectors */
DOUBLE *SubDVectors (v1, v2, vr, numels)
   DOUBLE *v1, *v2, *vr;
   LONG numels;
{
   LONG i;

   ChkDVector(vr,numels);
   for (i=0L ; i<numels ; i++) {
      vr[i] = v1[i] - v2[i];
   } /* for */
   return vr;

} /* SubDVectors () */

/* Add two double matrices */
DOUBLE **AddDMatrices (m1, m2 , mr, numrows, numcols)
   DOUBLE **m1, **m2, **mr;
   LONG numrows, numcols;
{
   LONG i, j;

   ChkDMatrix(mr,numrows,numcols);
   for (i=0L ; i<numrows ; i++) {
      for (j=0L ; j<numcols ; j++) {
         (mr[i])[j] = (m1[i])[j] + (m2[i])[j];
      } /* for j */
   } /* for i */
   return mr;

} /* AddDMatrices () */

/* Subtract two double matrices */
DOUBLE **SubDMatrices (m1, m2 , mr, numrows, numcols)
   DOUBLE **m1, **m2, **mr;
   LONG numrows, numcols;
{
   LONG i, j;

   ChkDMatrix(mr,numrows,numcols);
   for (i=0L ; i<numrows ; i++) {
      for (j=0L ; j<numcols ; j++) {
         (mr[i])[j] = (m1[i])[j] - (m2[i])[j];
      } /* for j */
   } /* for i */
   return mr;

} /* SubDMatrices () */

DOUBLE **MultDMatrices(m1, m2, mr, numrows1, numcols1, numcols2)
   DOUBLE **m1, **m2, **mr;
   LONG numrows1, numcols1, numcols2;
{
   LONG row1, col1, row2, col2;
   LONG numrows2;

   numrows2 = numcols1;  /* This MUST be true for multiplication */

   ChkDMatrix(mr,numrows1,numcols2);
   for (row1=0L ; row1<numrows1 ; row1++) {
      for (col2=0L ; col2<numcols2 ; col2++) {
         /* Initialize in case mr has non-zero elements */
         (mr[row1])[col2] = 0;
         for (col1=0L,row2=0L ; (col1<numcols1)&&(row2<numrows2) ;
               col1++,row2++) {
            (mr[row1])[col2] += (m1[row1])[col1] * (m2[row2])[col2];
         } /* for */
      } /* for */
   } /* for */
```

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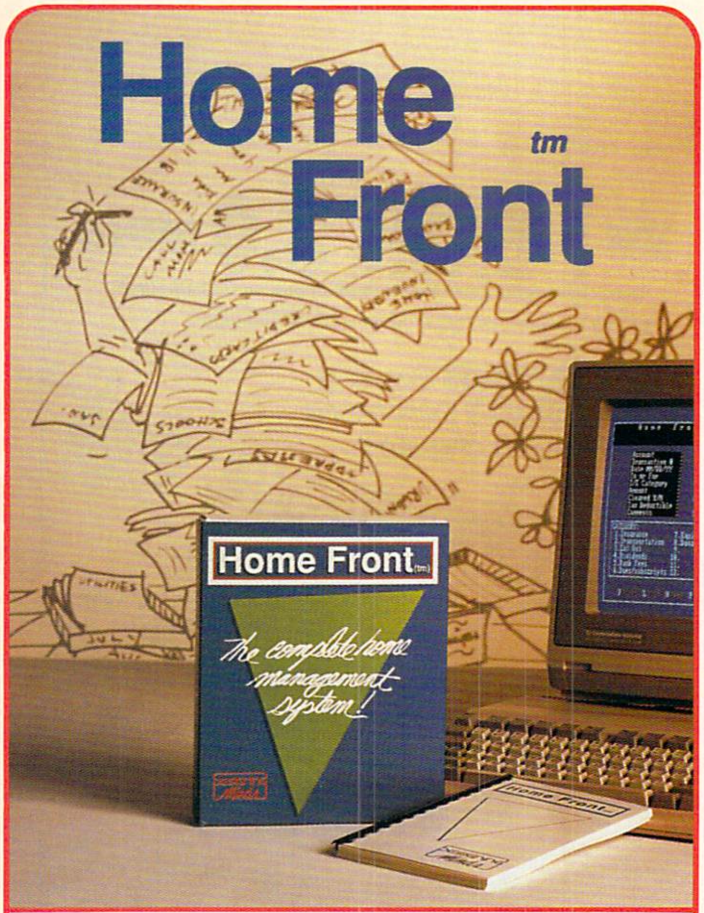

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```
   return mr;

} /* MultDMatrices */

DOUBLE *MultDVectorMatrix(v, m, vr, numels, numcols)
   DOUBLE *v, **m, *vr;
   LONG numels, numcols; /* Elements in vector, columns in matrix */
{
   LONG mrow, mcol, vcol;
   LONG numrows;

   /* This function calculates v*m, thus v MUST be a ROW VECTOR */

   numrows = numels;  /* This MUST be true for multiplication */

   ChkDVector(vr,numcols);
   for (mcol=0L ; mcol<numcols ; mcol++) {
      /* Initialize in case vr has non-zero elements */
      vr[mcol] = 0;
      for (vcol=0L,mrow=0L ; vcol<numels ; vcol++,mrow++) {
         vr[mcol] += v[vcol] * (m[mrow])[mcol];
      } /* for */
   } /* for */
   return vr;

} /* MultDVectorMatrix */

DOUBLE *MultDMatrixVector(m, v, vr, numrows, numels)
   DOUBLE *v, **m, *vr;
   LONG numels, numrows; /* Elements in vector, rows in matrix */
{
   LONG mrow, mcol, vrow;
   LONG numcols;

   /* This function calculates m*v, thus v MUST be a COLUMN VECTOR */

   numcols = numels;  /* This MUST be true for multiplication */

   ChkDVector(vr,numrows);
   for (mrow=0L ; mrow<numrows ; mrow++) {
      /* Initialize in case vr has non-zero elements */
      vr[mrow] = 0;
      for (vrow=0L,mcol=0L ; vrow<numels ; vrow++,mcol++) {
         vr[mrow] += (m[mrow])[mcol] * v[vrow];
      } /* for */
   } /* for */
   return vr;

} /* MultDMatrixVector */

DOUBLE **TransposeDMatrix(DOUBLE **m, DOUBLE **mt, LONG numrows, LONG numcols)
   /*    m is the matrix to be transposed
         mt is the transposed matrix
         numrows is number of rows in m
         numcols is number of columns in m
   */
{
   LONG i, j;

   /* If mt is NULL, client wants us to allocate.
      Notice that the number of rows and columns are reversed. */

   ChkDMatrix(mt,numcols,numrows);

   /* Transpose the matrix */
   for (i=0 ; i<numrows ; i++) {
      for (j=0 ; j<numcols ; j++) {
         (mt[j])[i] = (m[i])[j];
      }
   }
   return mt;

}  /* TransposeDMatrix */

/*-----------------------------------
   The next TWO routines are support routines for InvertDMatrix which
   follows.
-------------------------------------*/

/*    LUDecomp() breaks a matrix down into its lower and upper
      triangular parts. */

LONG LUDecomp(DOUBLE **a, LONG n, LONG *index)
   /*    a is the matrix to decompose
         n is the number of elements in the rows and columns
         index is an array for storing row permutations
   */
{
   LONG i, imax, j, k;
   DOUBLE biggest, dummy, sum, temp;
   DOUBLE *rowscale;

   rowscale = AllocDVector(n);
   if (!rowscale) return FALSE;  /* Allocation failed */

   for (i=0 ; i<n ; i++) {
      biggest = 0.0;
      for (j=0 ; j<n ; j++) {
         if ((temp=fabs((a[i])[j])) > biggest)  biggest=temp;
      } /* for  */
      if (biggest == 0.0)  return FALSE;  /* Singular matrix */
      rowscale[i] = 1.0/biggest;     /* Store the scale factor */
   }  /* for */

   for (j=0 ; j<n ; j++) {
      for (i=0 ; i<j ; i++) {
         sum = (a[i])[j];
         for (k=0 ; k<i ; k++)   sum -= (a[i])[k]*(a[k])[j];
         (a[i])[j] = sum;
      }  /* for */
      biggest = 0.0;
      for (i=j; i<n ; i++) {
         sum = (a[i])[j];
         for (k=0 ; k<j ; k++)   sum -= (a[i])[k]*(a[k])[j];
         (a[i])[j] = sum;
         if ((dummy=rowscale[i]*fabs(sum)) >= biggest) {
            biggest = dummy;
            imax = i;
         }  /* if */
      }  /* for */
      if (j != imax) {
         for (k=0 ; k<n ; k++) {
            dummy = (a[imax])[k];
            (a[imax])[k] = (a[j])[k];
            (a[j])[k] = dummy;
         }  /* for */
         dummy = rowscale[imax];
         rowscale[imax]=rowscale[j];
         rowscale[j] = dummy;
      }  /* if */
      index[j] = imax;
      if ((a[j])[j] == 0.0)   return FALSE;  /* Singular matrix */
      if (j != (n-1)) {
         dummy = 1.0/(a[j])[j];
         for (i=j+1 ; i<n ; i++)     (a[i])[j] *= dummy;
      }  /* if */
   }  /* for */
   FreeDVector(rowscale, n);
   return TRUE;
}  /* LUDecomp */

/*    LUFwdBckSub() performs a forward and back substitution on an
      LU decomposed matrix.*/

void LUFwdBckSub(DOUBLE **a, LONG n, LONG *index, DOUBLE *b)
   /*    a is the LU decomposed matrix
         n is the number of elements in the rows and columns
         index is the row permutation array from LUDecomp()
         b is the RHS vector  */
{
   LONG i, nonzero = -1, ip, j;
   DOUBLE sum;

   for (i=0 ; i<n ; i++) {
      ip = index[i];
      sum = b[ip];
      b[ip] = b[i];
      if (nonzero+1) {
         for (j=nonzero ; j<=i-1 ; j++)   sum -= (a[i])[j]*b[j];
      }
      else if (sum) {
         nonzero = i;
      }
      b[i] = sum;
   }  /* for */

   for (i=n-1 ; i>=0 ; i–) {
      sum = b[i];
      for (j=i+1 ; j<n ; j++)    sum -= (a[i])[j]*b[j];
      b[i] = sum/(a[i])[i];
   }  /* for */
}  /* LUFwdBckSub */

/*-----------------------------------
   Here is the InvertDMatrix function
-------------------------------------*/

DOUBLE **InvertDMatrix(DOUBLE **m, DOUBLE **mcopy, DOUBLE **mi, LONG numrows)
  /*  m is the matrix to invert
      mcopy is a copy of m, it will be destroyed in the LU decomposition
      mi is the inverse matrix
      numrows is the number of rows and columns in m */
{
   DOUBLE *column=NULL;
   LONG i,j, *index=NULL;
   BYTE mcopyflag=FALSE,
        miflag=FALSE,
        success=FALSE;

   /* If mcopy is NULL, client want us to allocate */
   if(!mcopy) {
      mcopy = AllocDMatrix(numrows, numrows);
      if (!mcopy)    return NULL;   /* Allocation failed, abort */
      for (i=0 ; i<numrows ; i++) {
         for (j=0 ; j<numrows ; j++) {
            (mcopy[i])[j] = (m[i])[j];
         }
      }
      mcopyflag = TRUE;    /* Will be used later for deallocation */
   }  /* if */

   /* Allocate index */
   index = AllocLVector(numrows);
   if (!index)    goto ExitInvert;     /* Allocation failed, abort */

   /* Allocate column */
   column = AllocDVector(numrows);
   if (!column)    goto ExitInvert;     /* Allocation failed, abort */

   /* If mi is NULL, client wants us to allocate */
   if (!mi) {
      mi = AllocDMatrix(numrows, numrows);
      if (!mi)    goto ExitInvert;   /* Allocation failed, abort */
      miflag = TRUE;    /* Used later for deallocation */
   }  /* if */

   /* Perform LU decomposition on mcopy */
   i = LUDecomp(mcopy, numrows, index);
   if (!i)   goto ExitInvert;  /* Matrix singular or alloc failed, abort */

   /* Calculate inverse one column at a time */
   for (j=0 ; j<numrows ; j++) {
      for (i=0 ; i<numrows ; i++)   column[i] = 0.0;
      column[j] = 1.0;
      LUFwdBckSub(mcopy, numrows, index, column);
      for (i=0; i<numrows ; i++)    (mi[i])[j] = column[i];
   }  /* for */

   success = TRUE;

ExitInvert:
   if (column)        FreeDVector(column, numrows);
   if (index)         FreeLVector(index, numrows);
   if (mcopyflag)     FreeDMatrix(mcopy, numrows, numrows);
   if (success) {
      return (mi);
   }
   else {
      /* deallocate mi matrix if we created it since routine failed */
      if (miflag)     FreeDMatrix(mi, numrows, numrows);
      return NULL;
   }
}  /* InvertDMatrix */
```

LISTING 3 - File Description File for Matrix.library

```
*
* Matrix.fd - File description for Matrix.c functions
*
##base _Matrix
##bias 30
##public
*
* LONG Functions
*
AllocLVector(numels)(D0)
AllocLMatrix(numrows,numcols)(D0/D1)
FreeLVector(v,numels)(A0,D0)
FreeLMatrix(m,numrows,numcols)(A0,D0/D1)
AddLVectors(v1,v2,vr,numels)(A0/A1/A2,D0)
SubLVectors(v1,v2,vr,numels)(A0/A1/A2,D0)
AddLMatrices(m1,m2,mr,numrows,numcols)(A0/A1/A2,D0/D1)
SubLMatrices(m1,m2,mr,numrows,numcols)(A0/A1/A2,D0/D1)
MultLMatrices(m1,m2,mr,numrows1,numcols1,numcols2)(A0/A1/A2,D0/D1/D2)
MultLVectorMatrix(v,m,vr,numels,numcols)(A0/A1/A2,D0/D1)
MultLMatrixVector(m,v,vr,numrows,numels)(A0/A1/A2,D0/D1)
TransposeLMatrix(m,mt,numrows,numcols)(A0/A1,D0/D1)
*
* DOUBLE Functions
*
AllocDVector(numels)(D0)
AllocDMatrix(numrows,numcols)(D0/D1)
FreeDVector(v,numels)(A0,D0)
FreeDMatrix(m,numrows,numcols)(A0,D0/D1)
AddDVectors(v1,v2,vr,numels)(A0/A1/A2,D0)
SubDVectors(v1,v2,vr,numels)(A0/A1/A2,D0)
AddDMatrices(m1,m2,mr,numrows,numcols)(A0/A1/A2,D0/D1)
SubDMatrices(m1,m2,mr,numrows,numcols)(A0/A1/A2,D0/D1)
MultDMatrices(m1,m2,mr,numrows1,numcols1,numcols2)(A0/A1/A2,D0/D1/D2)
MultDVectorMatrix(v,m,vr,numels,numcols)(A0/A1/A2,D0/D1)
MultDMatrixVector(m,v,vr,numrows,numels)(A0/A1/A2,D0/D1)
TransposeDMatrix(m,mt,numrows,numcols)(A0/A1,D0/D1)
InvertDMatrix(m,mcopy,mi,numrows)(A0/A1/A2,D0)
##end
```

LISTING 4 - Prototypes for Functions in Matrix.library

```
/*  MatrixProto.h
    Contains prototypes for user functions in Matrix.c */

/*  Prototypes for Matrix.library  */
extern LONG *AllocLVector(LONG);
extern LONG **AllocLMatrix(LONG,LONG);
extern BOOL FreeLVector(LONG *, LONG);
extern BOOL FreeLMatrix(LONG **,LONG,LONG);
extern LONG *AddLVectors(LONG *,LONG *,LONG *,LONG);
extern LONG *SubLVectors(LONG *,LONG *,LONG *,LONG);
extern LONG **AddLMatrices(LONG **,LONG **,LONG **,LONG,LONG);
extern LONG **SubLMatrices(LONG **,LONG **,LONG **,LONG,LONG);
extern LONG **MultLMatrices(LONG **,LONG **,LONG **,LONG,LONG,LONG);
extern LONG *MultLVectorMatrix(LONG *,LONG **,LONG *,LONG,LONG);
extern LONG *MultLMatrixVector(LONG **,LONG *,LONG *,LONG,LONG);
extern LONG **TransposeLMatrix(LONG **,LONG **,LONG,LONG);

extern DOUBLE *AllocDVector(LONG);
extern DOUBLE **AllocDMatrix(LONG,LONG);
extern BOOL FreeDVector(DOUBLE *, LONG);
extern BOOL FreeDMatrix(DOUBLE **,LONG,LONG);
extern DOUBLE *AddDVectors(DOUBLE *,DOUBLE *,DOUBLE *,LONG);
extern DOUBLE *SubDVectors(DOUBLE *,DOUBLE *,DOUBLE *,LONG);
extern DOUBLE **AddDMatrices(DOUBLE **,DOUBLE **,DOUBLE **,LONG,LONG);
extern DOUBLE **SubDMatrices(DOUBLE **,DOUBLE **,DOUBLE **,LONG,LONG);
extern DOUBLE **MultDMatrices(DOUBLE **,DOUBLE **,DOUBLE **,LONG,LONG,LONG);
extern DOUBLE *MultDVectorMatrix(DOUBLE *,DOUBLE **,DOUBLE *,LONG,LONG);
extern DOUBLE *MultDMatrixVector(DOUBLE **,DOUBLE *,DOUBLE *,LONG,LONG);
extern DOUBLE **TransposeDMatrix(DOUBLE **,DOUBLE **,LONG,LONG);
extern DOUBLE **InvertDMatrix(DOUBLE **,DOUBLE **,DOUBLE **,LONG);
```

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LISTING 5 - Header File Used by Example Programs

```
/* Test.h

   This is a header file used by several programs.
   It contains some #includes, and vector and
   matrix display routines.

   This code is FREELY DISTRIBUTABLE but
   NOT PUBLIC DOMAIN.
   (Written by Randy Finch)
*/

#include <exec/types.h>
#include <proto/exec.h>
#include <math.h>
#include <float.h>
#include <mieeedoub.h>
#include <stdlib.h>
#include <stdio.h>

/*
   Matrix.h contains all the #pragmas created by fd2pragma.
   MatrixProto.h contains all the Matrix.library function prototypes.
*/

#include "Matrix.h"
#include "MatrixProto.h"

struct Library *Matrix;    /* Global Library base pointer */

/*—————————————————————————————
      Display routines
——————————————————————————————*/

void DisplayLVector(lv,numels)
   LONG *lv, numels;
{
   LONG i;

   printf("\n");
   for (i=0 ; i<numels ; i++) {
      printf("%d\t", lv[i]);
   } /* for i=0  */
```

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION

1A. Title of Publication: Amazing Computing For The Commodore Amiga. 1B. Publication No.: 08869480. 2. Date of Filing: 10/1/90. 3. Frequency of Issue: Monthly. 3A. No. of Issues Published Annually: 12. 3B. Annual Subscription Price: $24.00. 4. Complete Mailing Address of Known Office of Publication: P.i.M. Publications, Inc., P.O. Box 869, One Currant Place, Fall River, MA 02722. 5. Complete Mailing Address of the Headquarters of General Business Offices of the Publisher: One Currant Place, Currant Road, P.O. Box 869, Fall River, MA 02722. 6. Full Names and Complete Mailing Address of Publisher, Editor, and Managing Editor: Publisher, Joyce A. Hicks, P.O. Box 869, Fall River, MA 02722; Editor, Donald D. Hicks, P.O. Box 869, Fall River, MA 02722; Managing Editor, Donald D. Hicks, P.O. Box 869, Fall River, MA 02722. 7. Owner: P.i.M. Publications, Inc., P.O. Box 869, Fall River, MA 02722; Joyce A. Hicks, P.O. Box 869, Fall River, MA 02722; Donald D. Hicks, P.O. Box 869, Fall River, MA 02722. 8. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages or Other Securities: None. 9. For Completion by Nonprofit Organizations Authorized To Mail at Special Rates; Not Applicable. 10. Extent and Nature of Circulation: (X) Average No. Copies Each Issue During Preceding 12 Months; (Y) Actual No. of Single Issue Published Nearest to Filing Date; 10A. Total No. of Copies (X) 37,305 (Y) 40,584. 10B. Paid and/or Requested Circulation: B1. Sales through dealers and carriers, street vendors, and counter sales: (X) 17,741 (Y) 27,874 B2. Mail Subscription: (X) 11,531 (Y) 11,198. 10C. Total Paid and/or Requested Circulation: (X) 29,272 (Y) 39,072. 10D. Free Distribution by Mail, Carrier or Other Means, Samples, Complimentary, and Other Free Copies; (X) 116 (Y) 112. 10E. Total Distribution: (X) 29,388 (Y) 39,184. 10F. Copies Not Distributed: F1. Office Use, left over*, unaccounted, spoiled after printing: (X) 2,881 (Y) 1,400. F2. Return from News Agents: (X) 5,036 (Y) 0. 10G. Total: (X) 37,305 (Y) 40,584. *Issues held for back issue sales.

```
   printf("\n");

} /* DisplayLVector */

void DisplayDVector(dv,numels)
   DOUBLE *dv;
   LONG numels;
{
   LONG i;

   printf("\n");
   for (i=0 ; i<numels ; i++) {
      printf("%f\t", dv[i]);
   } /* for i=0  */
   printf("\n");

} /* DisplayDVector */

void DisplayLMatrix(lm, numrows, numcols)
   LONG **lm, numrows, numcols;
{
   LONG i, j;

   printf("\n");
   for (i=0 ; i<numrows ; i++) {
      for (j=0 ; j<numcols ; j++) {
         printf("%d\t", (lm[i])[j]);
      } /* for j=0 */
      printf("\n");
   } /* for i=0  */

} /* DisplayLMatrix */

void DisplayDMatrix(dm, numrows, numcols)
   DOUBLE **dm;
   LONG numrows, numcols;
{
   LONG i, j;

   printf("\n");
   for (i=0 ; i<numrows ; i++) {
      for (j=0 ; j<numcols ; j++) {
         printf("%f\t", (dm[i])[j]);
      } /* for j=0 */
      printf("\n");
   } /* for i=0  */

} /* DisplayDMatrix */
```

LISTING 6 - MAKEFILE for the Example Programs

```
dummy: Matrix.library TestMatLib SimEqs LSReg 2DTrans
   @echo " "
   @echo "Matrix.library, TestMatLib, SimEqs, LSReg, and 2DTrans created."

Matrix.library: MatrixLib.o Matrix.o
   blink FROM MatrixLib.o Matrix.o TO Matrix.library LIB lib:lcmieee.lib
         lib:lc.lib lib:amiga.lib SC SD ND
   copy Matrix.library libs:

TestMatLib: TestMatLib.o
   blink FROM LIB:c.o TestMatLib.o TO TestMatLib LIB lib:lcmieee.lib
         lib:lc.lib lib:amiga.lib SC SD ND

SimEqs: SimEqs.o
   blink FROM LIB:c.o SimEqs.o TO SimEqs LIB lib:lcmieee.lib
         lib:lc.lib lib:amiga.lib SC SD ND

LSReg: LSReg.o
   blink FROM LIB:c.o LSReg.o TO LSReg LIB lib:lcmieee.lib
         lib:lc.lib lib:amiga.lib SC SD ND

2DTrans: 2DTrans.o
   blink FROM LIB:c.o 2DTrans.o TO 2DTrans LIB lib:lcmieee.lib
         lib:lc.lib lib:amiga.lib SC SD ND

MatrixLib.o: MatrixLib.a
   asm -d MatrixLib.a

Matrix.o: Matrix.c
   lc -d3 -fi -cc -b0 -r0 -v -sc=text -sd=text Matrix.c

TestMatLib.o: TestMatLib.c Matrix.h MatrixProto.h Test.h
   lc -d3 -fi -cc TestMatLib.c

SimEqs.o: SimEqs.c Matrix.h MatrixProto.h Test.h
   lc -d3 -fi -cc SimEqs.c

LSReg.o: LSReg.c Matrix.h MatrixProto.h Test.h
   lc -d3 -fi -cc LSReg.c

2DTrans.o: 2DTrans.c Matrix.h MatrixProto.h Test.h
   lc -d3 -fi -cc 2DTrans.c

Matrix.h: Matrix.fd
   fd2pragma Matrix.fd Matrix.h
```

LISTING 7 - Comprehensive Test Program for Matrix.library

```
/*
   TestMatLib.c

   Here is a test program that calls all of the functions in
   Matrix.library using #pragmas.

   This code is FREELY DISTRIBUTABLE but NOT PUBLIC DOMAIN
   (written by Randy Finch)
*/

#include "Test.h"

/*———
     main()
———*/

void main(argc,argv)
   int argc;
   char **argv;
{
   LONG i, j, k;
   LONG *lv[3];
   LONG **lm[3];
   DOUBLE *dv[3];
   DOUBLE **dm[3];
   DOUBLE **inverse;

   puts("\nOpening Matrix.library\n");
   Matrix = OpenLibrary("Matrix.library",1);
   printf("\nMatrix = %x\n",Matrix);

   if(!Matrix) {
      printf("\nCould not open Matrix.library!\n");
      exit(0);
   }

   for (i=0 ; i<3 ; i++) {
      if(!(lv[i] = (LONG *)AllocLVector(4))) {
         printf("\nCould not allocate vector %d.\n",i);
         exit(0);
      }
   }
   printf("\nLong vectors allotted.\n");

   for (i=0 ; i<3 ; i++) {
      if(!(dv[i] = (DOUBLE *)AllocDVector(4))) {
         printf("\nCould not allocate vector %d.\n",i);
         exit(0);
      }
   }
   printf("\nDouble vectors allotted.\n");

   for (i=0 ; i<3 ; i++) {
      if(!(lm[i] = (LONG **)AllocLMatrix(4,4))) {
         printf("\nCould not allocate matrix %d.\n",i);
         exit(0);
      }
   }
   printf("\nLong matrices allotted.\n");

   for (i=0 ; i<3 ; i++) {
      if(!(dm[i] = (DOUBLE **)AllocDMatrix(4,4))) {
         printf("\nCould not allocate matrix %d.\n",i);
         exit(0);
      }
   }
   printf("\nDouble matrices allotted.\n");

   for (i=0 ; i<3 ; i++) {
      for (j=0 ; j<=3 ; j++) {
         /* assign values to vector elements */
         (lv[i])[j] = (LONG)(10.0*drand48());
         (dv[i])[j] = 10.0*drand48();

         for (k=0 ; k<=3 ; k++) {
            /* assign values to matrix elements */
            ((lm[i])[j])[k] = (LONG)(10.0*drand48());
            ((dm[i])[j])[k] = 10.0*drand48();
         }
      }
   } /* for i=0  */
   printf("\nVectors and matrices assigned.\n");

   AddLVectors(lv[0],lv[1],lv[2],4);
   printf("\nLong vectors added.\n");
   DisplayLVector(lv[0],4);
   DisplayLVector(lv[1],4);
   DisplayLVector(lv[2],4);

   SubLVectors(lv[0],lv[1],lv[2],4);
   printf("\nLong vectors subtracted.\n");
   DisplayLVector(lv[0],4);
   DisplayLVector(lv[1],4);
   DisplayLVector(lv[2],4);

   AddLMatrices(lm[0],lm[1],lm[2],4,4);
   printf("\nLong matrices added.\n");
   DisplayLMatrix(lm[0],4,4);
   DisplayLMatrix(lm[1],4,4);
   DisplayLMatrix(lm[2],4,4);

   SubLMatrices(lm[0],lm[1],lm[2],4,4);
   printf("\nLong matrices subtracted.\n");
   DisplayLMatrix(lm[0],4,4);
   DisplayLMatrix(lm[1],4,4);
   DisplayLMatrix(lm[2],4,4);

   MultLMatrices(lm[0],lm[1],lm[2],4,4,4);
   printf("\nLong matrices multiplied.\n");
   DisplayLMatrix(lm[0],4,4);
   DisplayLMatrix(lm[1],4,4);
   DisplayLMatrix(lm[2],4,4);

   MultLVectorMatrix(lv[0],lm[0],lv[2],4,4);
   printf("\nLong vector and matrix multiplied.\n");
   DisplayLVector(lv[0],4);
   DisplayLMatrix(lm[0],4,4);
   DisplayLVector(lv[2],4);

   MultLMatrixVector(lm[0],lv[0],lv[2],4,4);
   printf("\nLong matrix and vector multiplied.\n");
   DisplayLMatrix(lm[0],4,4);
   DisplayLVector(lv[0],4);
   DisplayLVector(lv[2],4);

   lm[2] = TransposeLMatrix(lm[0],lm[2],4,4);
   printf("\nLong matrix transposed.\n");
   DisplayLMatrix(lm[0],4,4);
   DisplayLMatrix(lm[2],4,4);

   AddDVectors(dv[0],dv[1],dv[2],4);
   printf("\nDouble vectors added.\n");
   DisplayDVector(dv[0],4);
   DisplayDVector(dv[1],4);
   DisplayDVector(dv[2],4);

   SubDVectors(dv[0],dv[1],dv[2],4);
   printf("\nDouble vectors subtracted.\n");
   DisplayDVector(dv[0],4);
   DisplayDVector(dv[1],4);
   DisplayDVector(dv[2],4);

   AddDMatrices(dm[0],dm[1],dm[2],4,4);
   printf("\nDouble matrices added.\n");
   DisplayDMatrix(dm[0],4,4);
   DisplayDMatrix(dm[1],4,4);
   DisplayDMatrix(dm[2],4,4);

   SubDMatrices(dm[0],dm[1],dm[2],4,4);
   printf("\nDouble matrices subtracted.\n");
   DisplayDMatrix(dm[0],4,4);
   DisplayDMatrix(dm[1],4,4);
   DisplayDMatrix(dm[2],4,4);

   MultDMatrices(dm[0],dm[1],dm[2],4,4,4);
   printf("\nDouble matrices multiplied.\n");
   DisplayDMatrix(dm[0],4,4);
   DisplayDMatrix(dm[1],4,4);
   DisplayDMatrix(dm[2],4,4);

   MultDVectorMatrix(dv[0],dm[0],dv[2],4,4);
   printf("\nDouble vector and matrix multiplied.\n");
   DisplayDVector(dv[0],4);
   DisplayDMatrix(dm[0],4,4);
```

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```
   DisplayDVector(dv[2],4);

   MultDMatrixVector(dm[0],dv[0],dv[2],4,4);
   printf("\nDouble matrix and vector multiplied.\n");
   DisplayDMatrix(dm[0],4,4);
   DisplayDVector(dv[0],4);
   DisplayDVector(dv[2],4);

   dm[2] = TransposeDMatrix(dm[0],dm[2],4,4);
   printf("\nDouble matrix transposed.\n");
   DisplayDMatrix(dm[0],4,4);
   DisplayDMatrix(dm[2],4,4);

   inverse = InvertDMatrix(dm[0],NULL,NULL,4);
   if (inverse) {
      printf("\nDouble matrix inverted.\n");
      MultDMatrices(dm[0],inverse,dm[2],4,4,4);
      DisplayDMatrix(dm[0],4,4);
      DisplayDMatrix(inverse,4,4);
      DisplayDMatrix(dm[2],4,4);
   }
   else {
      printf("\nDouble matrix inversion failed.\n");
   }

   for (i=0 ; i<3 ; i++) {
      FreeLVector(lv[i],4);
      FreeDVector(dv[i],4);

      FreeLMatrix(lm[i],4,4);
      FreeDMatrix(dm[i],4,4);
   }
   if (inverse) FreeDMatrix(inverse,4,4);

   printf("\nVectors and Matrices freed.\n");

   CloseLibrary(Matrix);

} /* main */
```

LISTING 8 - Output from TestMatLib (Listing 7)

```
Opening Matrix.library


Matrix = 2af448
```

```
Long vectors allotted.

Double vectors allotted.

Long matrices allotted.

Double matrices allotted.

Vectors and matrices assigned.

Long vectors added.

0       2       8       9

7       7       8       4

7       9       16      13

Long vectors subtracted.

0       2       8       9

7       7       8       4

-7      -5      0       5

Long matrices added.

0       3       0       5
9       5       7       2
9       8       8       0
8       1       0       6

6       6       1       5
8       5       5       1
0       3       2       6
5       7       5       3

6       9       1       10
17      10      12      3
9       11      10      6
13      8       5       9

Long matrices subtracted.

0       3       0       5
9       5       7       2
9       8       8       0
8       1       0       6

6       6       1       5
8       5       5       1
0       3       2       6
5       7       5       3

-6      -3      -1      0
1       0       2       1
9       5       6       -6
3       -6      -5      3

Long matrices multiplied.

0       3       0       5
9       5       7       2
9       8       8       0
8       1       0       6

6       6       1       5
8       5       5       1
0       3       2       6
5       7       5       3

49      50      40      18
104     114     58      98
118     118     65      101
86      95      43      59

Long vector and matrix multiplied.

0       2       8       9

0       3       0       5
9       5       7       2
9       8       8       0
8       1       0       6

162     83      78      58

Long matrix and vector multiplied.

0       3       0       5
9       5       7       2
9       8       8       0
8       1       0       6

0       2       8       9

51      84      80      56

Long matrix transposed.

0       3       0       5
9       5       7       2
9       8       8       0
8       1       0       6

0       9       9       8
3       5       8       1
0       7       8       0
5       2       0       6

Double vectors added.

0.009854        8.312918        5.315569        1.183517

0.062295        3.672466        7.692211        5.691850

0.072148        11.985384       13.007780       6.875368
```

```
Double vectors subtracted.

0.009854 .      8.312918        5.315569        1.183517

0.062295        3.672466        7.692211        5.691850

-0.052441       4.640452        -2.376643       -4.508333

Double matrices added.

1.766426        0.913306        4.872172        4.544334
5.680596        0.508319        0.189148        2.981972
5.154312        1.884203        5.706140        8.152739
7.844836        2.533106        3.783775        6.809230

1.264624        7.709283        4.967217        3.159390
3.709947        4.278346        6.679786        8.307791
9.667296        0.820965        0.742624        8.101586
5.865103        8.716888        9.647036        3.928280

3.031051        8.622589        9.839389        7.703724
9.390543        4.786665        6.868934        11.289763
14.821608       2.705168        6.448764        16.254324
13.709940       11.249994       13.430811       10.737510

Double matrices subtracted.

1.766426        0.913306        4.872172        4.544334
5.680596        0.508319        0.189148        2.981972
5.154312        1.884203        5.706140        8.152739
7.844836        2.533106        3.783775        6.809230

1.264624        7.709283        4.967217        3.159390
3.709947        4.278346        6.679786        8.307791
9.667296        0.820965        0.742624        8.101586
5.865103        8.716888        9.647036        3.928280

0.501802        -6.795977       -0.095045       1.384944
1.970649        -3.770026       -6.490638       -5.325820
-4.512985       1.063237        4.963516        0.051153
1.979733        -6.183782       -5.863261       2.880951

Double matrices multiplied.

1.766426        0.913306        4.872172        4.544334
5.680596        0.508319        0.189148        2.981972
5.154312        1.884203        5.706140        8.152739
7.844836        2.533106        3.783775        6.809230

1.264624        7.709283        4.967217        3.159390
3.709947        4.278346        6.679786        8.307791
9.667296        0.820965        0.742624        8.101586
5.865103        8.716888        9.647036        3.928280

79.375906       61.137658       62.332459       70.492123
28.387779       72.116884       60.519871       35.416646
116.488163      123.548370      121.075932      110.193063
95.834172       133.777213      124.386423      103.232552

Double vector and matrix multiplied.

0.009854        8.312918        5.315569        1.183517

1.766426        0.913306        4.872172        4.544334
5.680596        0.508319        0.189148        2.981972
5.154312        1.884203        5.706140        8.152739
7.844836        2.533106        3.783775        6.809230

83.922330       17.248197       36.429924       76.228949

Double matrix and vector multiplied.

1.766426        0.913306        4.872172        4.544334
5.680596        0.508319        0.189148        2.981972
5.154312        1.884203        5.706140        8.152739
7.844836        2.533106        3.783775        6.809230

0.009854        8.312918        5.315569        1.183517

38.886308       8.816235        55.694297       49.306562

Double matrix transposed.

1.766426        0.913306        4.872172        4.544334
5.680596        0.508319        0.189148        2.981972
5.154312        1.884203        5.706140        8.152739
7.844836        2.533106        3.783775        6.809230

1.766426        5.680596        5.154312        7.844836
0.913306        0.508319        1.884203        2.533106
4.872172        0.189148        5.706140        3.783775
4.544334        2.981972        8.152739        6.809230

Double matrix inverted.

1.766426        0.913306        4.872172        4.544334
5.680596        0.508319        0.189148        2.981972
5.154312        1.884203        5.706140        8.152739
7.844836        2.533106        3.783775        6.809230

0.367334        0.273577        -0.391682       0.104005
-0.549834       -0.900882       -0.027173       0.794006
0.786954        0.106033        -0.587945       0.132319
-0.655954       -0.038968       0.788072        -0.341870

1.000000        -0.000000       0.000000        0.000000
-0.000000       1.000000        0.000000        0.000000
0.000000        0.000000        1.000000        0.000000
-0.000000       -0.000000       0.000000        1.000000

Vectors and Matrices freed.
```

•AC•

(Stepper Motors, continued from page 22)

buffer in place the transistors are kept off. This allows you time to go through the Startup-Sequence and load AmigaBASIC and the stepper program without worrying about damaging the computer *or* draining the batteries.

PROGRAMS

Each of the 3 basic programs performs a specific function. Program 1 rotates the stepper one revolution in a CW direction. Program 2 accomplishes the same thing in half steps. The rotation of the shaft is noticeably smoother in the half step mode. Program 3 performs a scanning function, first rotating CW for 180 degrees, then reversing direction CCW for 180 degrees. The program operates until a key is pressed.

I have placed a timing loop in each program to slow the program down (how many times have you ever done that to a basic program)? Without the timing loop, the rpm of the motor in full step is approximately 100–120 RPM.

All the programs are simple, and you should be able to modify them without any problem. You do have to watch to make sure you keep the signals inverted. A simple analysis of the signal inversion section of the program might be a little sticky, so we'll do that now.

As its name implies, the inverter IC inverts a signal. So, a binary 1 on its input becomes a binary 0 at its output, and vice versa. Because we are using a 4049 inverter between the parallel port and transistor switches, we need to invert the signals to the inverter to get the correct signals to the transistors.

In the test circuit, we simply pressed the switches S1, S2, S3 and S4 in sequence to rotate the shaft 15 degrees (4 steps x 3.75 degree/step). On the Amiga, these lines are connected to PB0 thru PB4. To activate the same sequence, we can poke the binary numbers 1, 2, 4 and 8 into the data register (dr). But wait, we must compensate for the inverter. To turn on a particular line, we actually have to turn it off by outputting a binary 0, while the remaining lines must be turned off by outputting a binary 1. One line in the program accomplishes this for us:

```
st = 15 - cw(i)
```

The number st is poked into the DR register.

TROUBLESHOOTING

If you use the stepper motor listed in the parts list, you should not run across any problems. If you do, the first thing to check is the diodes. Make sure you have them in properly, facing in the direction shown in the schematic.

If the stepper motor moves slightly (quivers back and forth), chances are the batteries are too weak to power the motor. Replace them with fresh batteries, and be aware for now that the batteries will wear out pretty quickly. This problem will be solved later in this project, when we modify your existing circuit board to use line voltage with a step-down transformer.

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Circle 149 on Reader Service card.

GOING FURTHER

There are a number of dedicated integrated circuits available for powering and controlling stepper motors. Use of these IC's in conjunction with the Amiga would reduce the amount of dedicated lines required off the parallel port.

Parts List	
IM-Step 3.75 Stepper Motor (6 wire)	$10.00, plus $2.50 s & h
Available from :	Images Company P.O. Box 313 Jamaica, NY 11419
D1-D4 1N914 diode (50/pak)	Radio Shack # 276-1620
PC board terminals stackable	RS # 276-1388
DB-25 PIN male connector	RS # 276-1547
4049 Inverting Hex Buffer	RS # 276-2449
16-pin socket for 4049	RS # 276-1998
S1-S4 momentary push switch (4/pak)	RS # 275-1547c
Q1-Q4 NPN transistors (15/pak)	RS # 276-1617
Battery holder	RS # 270-405
Battery	RS # 23-144
PC board	RS # 276-170

(listing follows)

Program 1: stepper one

```
setup:
ddr = 12575489&
dr = 12574977&
POKE dr,15
POKE ddr ,255
DIM cw(4)
cw(1)=1:cw(2)=2:cw(3)=4:cw(4)=8
REM run stepper
FOR j = 1 TO 24
FOR i = 1 TO 4
st = 15 - cw(i)
POKE dr,st
FOR t = 1 TO 50:NEXT t
NEXT i
NEXT j
POKE dr,15
END
```

Program 2: half step

```
REM Stepper-Motor
setup:
ddr = 12575489&
dr = 12574977&
POKE dr,15
POKE ddr ,255
DIM cw(8)
cw(1)=1:cw(2)=3:cw(3)=2:cw(4)=6
cw(5)=4:cw(6)=12:cw(7)=8:cw(8)=9
FOR j = 1 TO 24
FOR i = 1 TO 8
st = 15 - cw(i)
POKE dr,st

NEXT i
NEXT j
POKE dr,15
END
```

Program 3: scanning function

```
REM Stepper-Motor
setup:
ddr = 12575489&
dr = 12574977&
POKE dr,15
POKE ddr ,255
DIM CW(4)
CW(1)=1:CW(2)=2:CW(3)=4:CW(4)=8
flg = 0
scan:
 a$ = INKEY$
 IF a$ <> "" THEN Finish
FOR j = 1 TO 12
IF flg = 0 THEN GOSUB CW1
IF flg = 1 THEN GOSUB CCW1
NEXT j
IF flg = 0 THEN flg = 1:GOTO scan
IF flg = 1 THEN flg = 0:GOTO scan
POKE dr,15
END
 CW1:
FOR i = 1 TO 4
st = 15 - CW(i)
POKE dr,st
FOR t = 1 TO 50:NEXT t
NEXT i
RETURN
CCW1:
FOR i = 4 TO 1 STEP -1
st = 15 - CW(i)
POKE dr,st
FOR t = 1 TO 50:NEXT t
NEXT i
RETURN
Finish:
 POKE dr,15
 END
```

•AC•

(C Notes, continued from page 68)

```
    }
    exit(0);
}

/*————————————*/
#ifdef LATTICE
int accepted(char *lbuf,unsigned int count)
#else
int accepted(lbuf,count)
char *lbuf;
unsigned int count;
#endif
{
    char buf[80];

    if (count > 65) count = 65;             /* this is display length*/
    for(; count > 0; count-,lbuf++){       /* print out characters */
         printf("%c",*lbuf);                  /* one char at a time */
    }
    printf("\n\nIs this okay (Yes or No)?"); /* ask for approval */
    if (gets(buf) != NULL){                  /* get the answer */
         if (toupper(buf[0]) == 'Y') return(TRUE); /* accepted */
    }
    return(FALSE);                           /* not accepted */
```

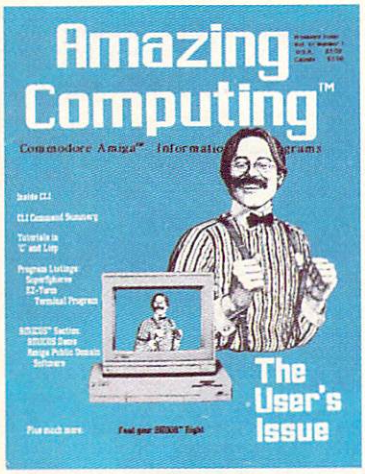
The comments in the listing should adequately explain the functionality of the program, but here are a few side points that may help in your implementation. First, the program should compile equally well for both the Manx C and the Lattice C compilers. When you compile with Lattice, the keyword LATTICE is automatically defined for you and, therefore, the appropriate code is included (or excluded). Likewise, when compiling under Manx, LATTICE is not defined and therefore the alternative code is included.

The primary difference between compilers can be found in how each one's library handles wildcard "pattern" filename searches. Lattice uses the more common approach of separating the "find first" and "find next" operations with the functions dfind() and dnext(). These functions return the file information into a predefined structure. Manx's library, on the other hand, hides these operations and simply returns a pointer to each filename. The program only requires each filename that matches a given pattern. Therefore, pointing at the area in the structure that contains the name is a satisfactory alternative in the Lattice environment.

One final point regarding the difference in how these environments handle wildcard patterns is the wildcard characters that are supported. Manx supports the asterisk for multi-character references, and the question mark for single-character references, which are more common in the IBM PC world. Lattice offers the same support by changing a global reference (see the manual) but defaults to the wildcard characters supported by the AmigaDOS environment.

Of course, other methods could be employed instead of the one used in the program SECRET. We have just scratched the surface in the world of cryptography. Take the program and try it out if you like, but be careful—if you forget a password, you'll have to develop your own expertise on the flip side of the science.

•AC•



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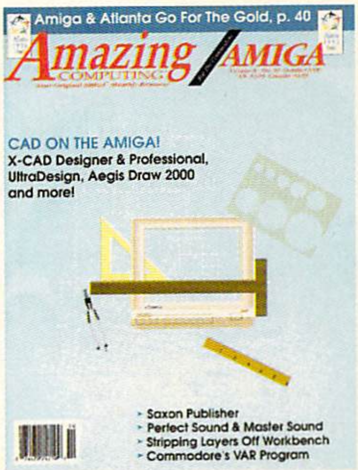
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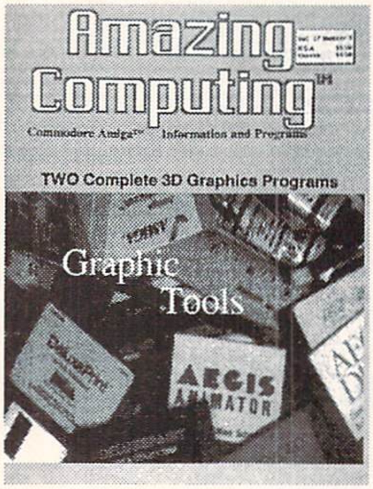
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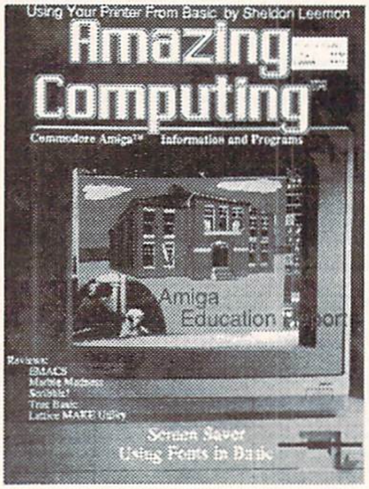
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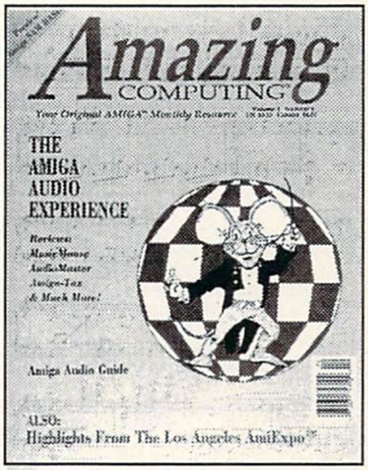

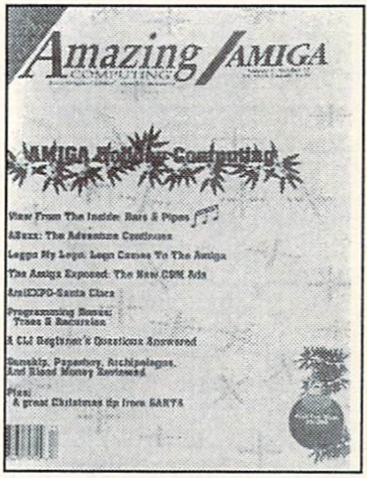
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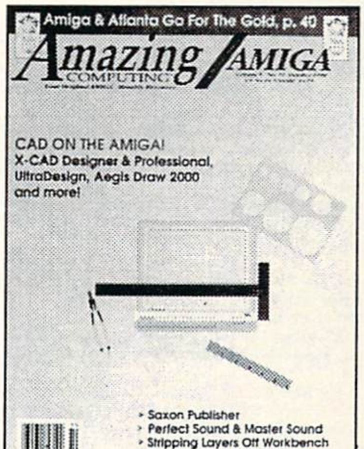
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The Fred Fish Collection

Due to the increasing size of the Fred Fish Collection, only the latest disks are represented here. For a complete list of all AC, AMICUS, and Fred Fish Disks, cataloged and cross-referenced for your convenience, please consult the current *AC's Guide To The Commodore Amiga* available at your local Amazing Dealer.

Fred Fish Disk 366

3DTicTacToe	A three-dimensional "four-in-a-row" V of TicTacToe, human against computer. V1.2, binary only. Author: Ron Charlton
DosError	A small CLI utility that will return a slightly more verbose description of a DOS error code than that returned by the System. Can save a trip to the manual for vague or unfamiliar error codes. V2.0, includes source in assembly.Author: Robert Lang
IntuiFace	An intuition interface that handles the important functions of creating, inserting, extracting and listing files for three popular archiving utilities: ARC, ZOO and LHARC.V1.00, binary only, shareware.Author: Matthias Zepf
LoanCalc	Entirely keyboard driven mortgage utility. Although similiar programs exist, this one is unique in that it is designed to track 'Open' mortgages that allow any size payment to be made at any time as well as providing an amortization table for fixed mortgages with monthly, semi-monthly, bi-weekly andweekly payment schedules. V1.2, binary only. Author: Robert Bromley
PhoneWord	takes a full or partial telephone number and attempts to create a word from the various "alphabedigit" combinations. Includes source.Author: Ron Charlton
Unjumble	may be useful in solving the Sunday morning newspaper "Scramble". Includes source.Author: Ron Charlton
MeMeter	A small utility for monitoring the Amiga's memory usage. Unique snapshot facility allows you to store the current numbers, launch a program, see how much memory it requires, end the program, and see if it returns all the memory. V2.1, binary only. Author: Gaylan Wallis
NDebt	Amusing, but saddening, this program opens a small window that displays a continuously updated tally of America's national debt, based on its historically phenomenal growth rate. V1.1, includes source. Author: Ron Charlton
PrintStudio	Very nice intuition-based general purpose print utility that prints text with a variety of options. Prints several graphic formats with yet more options. Print any part of a picture, print screens and windows, save screens and windows as IFF files, modify color palettes, change printing parameters and lots more! V1.2, binary only, shareware. Author: Andreas Krebs

Fred Fish Disk 367

Enigmas	Nifty graphic simulation of the World War II German Enigma-Machine, a message encoding/decoding device that produced extremely difficult to crack cryptographic code. Binary only. Author: Gaylan Wallis
GwPrint	An intuition-based text file print utility. Offers a wide selection of adjustable features for controlling pagination, headers, trailers, margins, date and page-numbering and various print styles/sizes. V2.0, binary only, shareware. Author: Gaylan Wallis
HyperDialer	Database for names and addresses, full intuition interface Dynamically allocated, with configurable script startup file.Iconifies to titlebar icon. Search, sort, insert, delete, full file requesters. Uses modem to control dialing of multiple phone numbers. Binary only, shareware, with source available from author. Author: David Plummer
SCM	Screen Color Modifier. A palette program that allows the changing/saving/loading of a screen's colors. Includes a separate loader program that can be used in batch files to set a screen's colors to predefined values after a program has been launched. V1.0, binary only.Author: Jean-Marc Nogier
SuperView	A shareware file-viewer that displays all types of IFF files with many features like: Workbench support, all display modes, auto overscan, color cycle (CRNG, CCRT), AmigaBasic ACBM files, first cell in and ANIM file, Type 5 animations and more. Written in assembly, pure code for residency under 1.3. V3.0, binary only.Author: David Grothe
Tricky	Another of Peter's innovative and addictive games. Sort of a "video-bowling" concept where the object is to wipe out groups of "computerized" symbols in such a fashion that the last item hit becomes the target for the next ball (with a few tricks of course!). Lots of levels and the usual level editor that accompanies most of Peter's games. Binary only.Author: Peter Handel

Fred Fish Disk 368

Elements	Very nice interactive display of the the Periodic Table of Elements. This is V2.0, an update to FF297. This version adds general row and column information, plus a test mode where the program asks specific questions about the selected element or row/column. Binary only, shareware. Author: Paul Thomas Miller
GraphicsPak	A set of functions for general graphics operations such as boxes/lines, blitting, and opening/closing the libraries. It is used by both of the PopMenu and ListWindow test programs. Includes source.Author: Paul Thomas Miller
Lila	A shareware utility that allows you to print listings or other text files on Postscript printers, with header, page numbers, and multicolumn pages. Can print in portrait or landscape orientation. V8912a, binary only. By Bertrand Gros
ListWindow	Gives simple initialization, handling, and freeing of Macintosh-like "list-windows." These are user-sizeable windows with a scrollable list of text strings, optionally sortable. The list can be scrolled with a scroll-bar, up and down arrows, arrow keys, or a SHIFT+key combination which searches for the first occurance of the specified key. Source and a sample program included.Author: Paul Thomas Miller
NewEx	An assembly program to replace xicon, IconX and similar utilities. Unique in the fact that it uses a WorkBench "Tool" icon instead of a "Project" icon. This allows workbench startup of programs that could ordinarily only be started by the CLI. V1.1, includes assembly source.Author: Kjell Cederfeldt
PopMenu	A set of functions for the setting up, drawing, and handling of pop-up menus that are affixed to windows. Clicking on the menu box area will open up the full menu, with the list of menu items inside. Source and a sample program included. Author: Paul Thomas Miller
SuperMenu	An information display system you can use to quickly and easily display text files (and sections of text files) with the press of a button. V2.0, shareware, binary only.Author: Paul Thomas Miller
SysInfo	A program which reports interesting information about the configuration of your machine, including some speed comparisons with other configurations, versions of the OS software, etc. V1.4, binary only.By Nic Wilson
Today	Amiga implementation of IBM PL/1 history program. Tells you important events and birthdays on current or specified day. Command line options include once-per-day setting for startup sequences. V0.91, binary only, shareware.Author: David Plummer, data files originally from an IBM VM/CMS version by Mike Butler

Fred Fish Disk 369

AQData	Information to aid users in updating B. Lennart Olsson's Aquarium V1.12 database. Includes information on disks up to number 360. Author: Howard Hull
Flip	Another program in the long tradition of screen hacks. Run it and see what happens. Binary only.Author: Andreas Schildbach
Fortune	Randomly display a 'fortune' selected from a fortunes file (supplied), by text or voice. New version will work from the Workbench or CLI. V2.04g, update to FF311, source included. Author: George Kerber
Spy	A program that tracks calls to AmigaDOS and Exec functions, reporting them to the screen, along with their calling parameters and the results. V1.0, includes source.Author: Federico Giannici
VAXterm	A VT220 terminal emulatbr that is close to the real VT220 terminal in both supported facilities and user interface. Designed primarily for connection to VAX/VMS, it should work with any host computer with VT220 terminal support. Supports file transferring for ASCII files by means of DCL commands. V2.4, includes source. Author: Tuomo Mickelsson
XprTransmit	XprTransmit is a Cli-based command that allows you to easily access to any Xpr Library without having to worry about call-back-function et cetera. It is able to access every "serial.device"-like exec-device. Only little documentation. V1.0, binary only.Author: Andreas Schildbach

Fred Fish Disk 370

SKsh	A ksh-like shell for the Amiga. Some of its features include command substitution, shell functions with parameters, aliases, local variables, local functions, local aliases, powerful control structures and tests, emacs style line editing and history functions, I/O redirection, pipes, large variety of built-in commands, Unix style wildcards, Unix style filename conventions, filename completion, and coexistence with scripts from other shells. Very well documented. V1.5, an update to FF342. New features include user definable keymaps, an ARexx port, many new internal and external commands, selective disabling of wildcards, preparsing of script files, bug fixes, and more.Author: Steve Koren

Fred Fish Disk 371

Fractals	A Fractal generator that generates many different types of fractals based on the iteration of complex-valued formulas. The program can generate the Mandelbrot and Julia sets, as well as the sets of more unusual formulas such as lambda*COS(Z) and Newton-R. Version 2.1, includes source and some sample creations. Author: Ronnie Johansson.
LockDevice	A package to protect filing devices from being accidentally formatted. Can be used with any filing device and file system. Version 1.0, includes source. Author: Olaf Barthel
Port2	Sample C program showing how to control a mouse connected to the second mouse/joystick port. Executable creates a second mouse pointer that is controlled by a mouse plugged into port 2. Version 1.0, includes source. Author: Olaf Barthel
PPLib	A shared, runtime library to aid in the development of programs that need to decrunch files crunched with Power- Packer. Version 34.1 (release 1.1), binary only. Author: Nico François
PPMore	A "more" replacement program that reads normal ascii text files as well as files crunched with PowerPacker. The crunched files can result in considerable disk space savings. Version 1.7, update to version on disk number 334, binary only. Author: Nico François
PPShow	A "show" program for normal IFF ILBM files or ILBM files crunched with PowerPacker. The decrunching is done auto- matically as the file is read. Version 1.2, update to version on disk number 334, binary only. Author: Nico François
PPType	A "print" program that will print normal ascii files or files crunched with PowerPacker. Several nice features such as page headers and numbers, adjustable tab sizes, page info taken from preferences and more. Version 1.1, binary only. Author: Nico François

Fred Fish Disk 372

Magnetic_Pages	A software package that allows you to create and display a disk-based magazine. The magazine produced is of a similar format to that of a traditional paper magazine. You can combine text and graphics on a single page, branch to different sections by clicking on icons and play sound and music. Features a full intuition driven interface. Version 1.0, shareware, binary only. Author: Mark Gladding.
PLW	Phone-Line-Watcher. For users of Hayes compatible modems. Monitors the serial port and records all incoming calls. Allows a remote user to login, receive and leave a message, and transfer files via Zmodem in either direction. Two level DOS access, Disabled DOS-requestors and more. Greatly enhanced version of initial release on disk 363. Version 2.8, binary only. Author: Christian Fries
RemapIcon	A utility to remap icons to be exchanged between Kickstart 2.0 and Kickstart 1.2/1.3 Workbench environments. The icon images are remapped to reflect the different colour palette used by the Workbench releases. Version 1.0, includes source. Author: Olaf Barthel

Fred Fish Disk 373

Multiplot	An intuitive data plotting program featuring flexible input options, arbitrary text addition, automatic scaling, zoom and slide with clipping at boundaries, a range of output file formats and publication quality printed output. Workbench printers are supported via transparent use of the PLT: device. This is version XLNc, an update to the version on disk 333. Includes many new features, a nicer user interface, and low memory options allowing it to be used in half megabyte machines. Includes source. Authors: Alan Baxter, Tim Mooney, Rich Champeaux, Jim Miller

Fred Fish Disk 374

IPDevice	Pipes for Power People. A pipe-like DOS device that passes data immediately rather than waiting until a buffer is full. It also allows multiple writers to a single channel, maintained connections, and piped connections to a Shell. Binary only. Author: Pete Goodeve
Mat	A comprehensive String-Search/Pattern-Match Utility for both text files and directories. A powerful command line syntax allows automatic file editing, construction of command scripts, and so on. Example Shell scripts are included. Binary only (a much enhanced version of the original on Disk #102). Author: Pete Goodeve.
PopArt	Intuition based image data generator and animator. Includes source. Author: Philip
SoftSpan	Soft Span BBS program. Intuitive, command-line based menu system with message bases, uploads, downloads, file credit system, extensive help system, etc. Version 1.1, an update to that on disk number 343, includes bug fixes and some enhancements. Binary only. Author: Mark Wolfskehl

Fred Fish Disk 375

BI	A brush to C code image converter. This is version 1.3, an update to version 1.0 on disk number 184. Contains bug fixes and support for AmigaBasic. Binary only. Author: Terry Gintz
CardMaker	A programmer's aid for creating card image data that can be used in any card game that uses the standard 52 card deck. This is version 2.1, an update to version 1.0 on disk number 184. Contains bug fixes and support for AmigaBasic. Binary only. Author: Terry Gintz
ParM	Parameterable Menu. ParM allows you to build menus to run programs in either the CLI or WorkBench environment. ParM can have it's own little window, or attach menus to the CLI window you are running it from. Version 1.1, includes source. Author: Sylvain Rougier, Pierre Carrette
TextPlus	A word processor for the Amiga, with both German and English versions. TextPlus enables you to write letters, books, programs etc. in a very easy and comfortable way. Version 2.2, an update to version 2.0 on disk number 359. Now includes full source. Author: Martin Steppler

Fred Fish Disk 376

AztecArp	An Arp package fixed to work with the 5.0 release of the Aztec 'C' compiler. The original Manx support files were incomplete, contained bugs, and had the wrong linker format. This is an update to the version on disk number 353, fixing a couple of bugs and adding some new useful features. Includes source. Author: Olaf Barthel
Matrix	Solves systems of linear equations. Includes both PAL and NTSC versions. Version 1.00, includes source. Author: Rudiger Dreier
Plotter	A two-dimensional mathematical function plotting program. Includes both PAL and NTSC versions. Version 3.71, includes source. Author: Rudiger Dreier
ToolLibrary	A shared library for the Amiga. Contains some mathematical (evaluation of strings) and Intuition (menus, requester) functions. Version 2.06, includes source. Author: Rudiger Dreier.

Fred Fish Disk 377

AnsiRead2	Bridges the gap between IBM and Amiga ANSI by displaying IBM ANSI text and graphic animations (as usually captured from bulletin boards) in their full intended colors and motion. Includes several samples. Version 0.2, binary only, shareware. Author: Glenn Kauffman
Formatter	A disk formatting program with an intuition interface which supports write verification, disk installation, fast formatting and automatic start. Formats a 3.5" disk in a multitasking environment in about 1:36 minutes (with verify turned on). Version 2.4a, includes source. Author: Olaf Barthel
Icon2C	A simple tool to turn any Workbench icon file into 'C' sourcecode, similar to the program of the same name by Carolyn Scheppner on disk number 56. This version has an arp interface and offers support for Kickstart 2.0 icons. Version 1.2, includes source. Author: Olaf Barthel
IE	An icon editor which can create and modify icons up to 640x200 pixels in size (also dual render). It can set stack size, position of icon (also free-floating), default tool, 10 tool types and control over opened window. It can also generate the C source code behind the icon for program inclusion. Now reads/writes IFF files and handles 4 or 8 colour icons. Version 2.0, update to version on disk number 342, source available from author. Author: Peter Kiem
IntuitionEd	Intuition based utility that creates C source code for screen, window, border and text structures. IntuitionEd can also write the code for several functions required for the opening and closing of these structures. The code can then be compiled by either Manx and Lattice. Shareware donation to the author will receive an enhanced version capable of writing gadget structures as well. Version 1.0, binary only, several samples included. Author: Niels Thorwirth
PowerLOGO	An experimental programming language based on Lisp and LOGO. It is versatile, highly interactive, organizes programs as collections of procedures, and includes lists as first-class data objects. Version 1.00, binary only. Author: Gary Teachout

Fred Fish Disk 378

Adapt	CLI utility that converts special German characters in files imported from MS-DOS systems into the right Amiga codes. Can easily be changed to work with other languages. Version 2.2, includes source. Author: Lars Eggert
ANSIMaster	ANSI editor that provides the full IBM font set and color capability. Very useful for the design of custom ANSI screens/graphics for telecommunications. Version 1.0, binary only. Authors: James Davis and Joe Rattz, Jr.

DevRen	A DEVice RENamer, originally designed to allow the renaming of an external drive on an A2000 (always recognized as DF2:) to be DF1: However, works with any mounted device such as RAD: RAM: RAW: CON: etc, as long as the original and renamed version have the same character length. Version 1.5, includes source. Author: Stefan Rosewig
JoyLib	Both a linktime version and a shared library of Joystick routines featuring a technique which proves to be extremely fast on 68010 or higher processors, and still faster than most of the other routines on standard processors. Includes source for library in Assembler and the demonstration program in C. Author: Oliver Wagner
MachIII	A "mouse accelerator" program that also includes hotkeys, the features of sun mouse, clicktofront, popcli, title bar clock with a bbs online charge accumulator, Arexx support and much more. This is version 3.0, an update to version 2.6 on disk 254. Binary only. Author: Brian Moats and Polyglot software
MuchMore	Another program like "more", "less", "pg", etc. This one uses its own screen to show the text using a slow scroll. Includes built-in help, commands to search for text, and commands to print the text. Works with PAL or NTSC, in normal or overscan modes. Supports 4 color text in bold, italic, underlined, or inverse fonts. Version 2.7, this is an update to version 2.5 from disk 253. Includes source in Oberon and assembly code. Author: Fridtjof Siebert
MuchMorePoPa	Extended version of MuchMore V2.7. Displays texts that have been packed with PowerPacker. Version 2.7, includes source in Oberon and assembly code. Author: Fridtjof Siebert
Observer	Working example for a Lattice LSR-program. Opens a small window and displays volume names of all inserted disks (DF0: through DF3:). Includes source in Lattice C. Author: Oliver Wagner
TheGuru	A program to bring the Guru back into Kickstart 2.0, for those who will miss it, (well sorta anyway!). Version 1.0, binary only. Author: Nico François

Fred Fish Disk 379

Append	CLI utility that allows you to directly append one or more files to another without having to use the roundabout methods necessary with the AmigaDOS "join" command. Version 1.0, includes source. Author: Oliver Enseling
FileEncrypt	Another intuition based file encryptor to enable you to scramble your highly secret, hard earned source code and prevent your co-workers from taking credit for it! Includes (unscrambled) source. Author: Lorenz Wiest
LLSort	Replacement for the AmigaDOS SORT command. Pure bit set and may be made resident. Features COLSTART and FIELDS parameters and sorts in either ascending/descending order. Also sorts with or without case sensitivity. Binary only. Author: Les Leist
TheA64Package	A comprehensive emulator/utility package to assist Commodore 64 users in upgrading to the Amiga. According to the author, this package compares to or surpasses the commercially available packages of the same nature. Many of the utilities require a hardware interface that allow the Amiga to access C64 peripherals such as disk drives and printers. The hardware interface is free with a shareware donation to the author. Version 1.00, binary only. Author: Cliff Dugan, QuesTronix
Xnum	A useful CLI conversion utility that takes a decimal, binary, octal or hex number as input and displays the number in all four formats. Binary only. Author: Oliver Enseling
Yawn!	A small WorkBench sliding block puzzle to keep your mind and fingers busy while your compiler is busy crunching away on your highly secret, hard earned source code that you hopefully remembered to unscramble first! Features selectable size from 4x4 to 7x7 and European, Hindi or Arabic numerals. Includes source. Author: Lorenz Wiest

Fred Fish Disk 380

Oberon	A freely distributable demo version of a powerful Oberon compiler. Oberon is a modern, object oriented language developed by Prof. Dr. Niklaus Wirth of ETH Zürich in Switzerland as a successor to Modula-2. This single pass compiler creates standard Amiga object files, uses a large variety of optimizations to create fast code, supports writing of reentrant programs, allows you to call code from other languages like C and Assembler, etc. The package includes the compiler, an editor, a link utility, a program to display compilation errors and some demo programs. Version 1.16, binary only. Author: Fridtjof Siebert

Fred Fish Disk 381

SKsh	A ksh-like shell for the Amiga. Some of its features include command substitution, shell functions with parameters, aliases, local variables, local functions, local aliases, powerful control structures and tests, emacs style line editing and history functions, I/O redirection, pipes, large variety of built-in commands, Unix style wildcards, Unix style filename conventions, filename completion, and coexistence with scripts from other shells. Very well documented. Version 1.6, an update to version 1.5 on disk 370. Includes several important bug fixes and a few minor new features such as command line cut and paste. Binary only. Author: Steve Koren

Fred Fish Disk 382

CrossDOS	A "tryware" version of a mountable MS-DOS file system for the Amiga. This is a software product that allows you to read and write MS-DOS/PC-DOS and Atari ST formatted disks (Version 2.0 or higher) directly from AmigaDOS. This tryware version is a "readonly" version, which does not allow any writes to the disk. A fully functional version is available for a very reasonable price from CONSULTRON. This is version 4.00b, an update to version 3.05b on disk 252. Binary only. Author: CONSULTRON, Leonard Poma
Msh	An Amiga file system handler that handles MS-DOS formatted diskettes. Version "1.30" (Release 1 patch 3). You can use files on such disks in almost exactly the same way as you use files on native AmigaDOS disks. This is a fully functional, read/write version, that supports 8, 9, or 10 sector disks of 80 tracks, and should also work on 40 track drives and hard disks with 12 or 16 bit FAT of any dimension the FAT allows. Update to version "1.5" (Release 1) on disk 327. Includes source. Author: Olaf Seibert

Fred Fish Disk 383

LHArc	An archive program like Arc and Zoo, with a heavy emphasis maximum compression for minimum archive size, using LZHUF compression. This is version 1.21, an update to version 1.10 on disk 312. Binary only. Author: Paolo Zibetti
LibraryKiller	A small utility that allows you to remove libraries that aren't used any more. Version 1.0, includes source in assembly. Author: Roger Fischlin
MandelMountains	A program that renders three-dimensional images of blowups of the Mandelbrot set. Includes several example images. This is version 2.1, an update to version 2.0 on disk 354. The most significant enhancement for this version is that is is two to three times faster due to inclusion of a specially tuned fixed point arithmetic package. Shareware, binary only. Author: Mathias Ortmann
Pcopy	An intuition based disk copier for AmigaDOS disks featuring high speed diskcopy with write verify, data recovery from damaged tracks, full multitasking compatibility, and a user friendly interface. This is version 2.11, an update to version 2.0 on disk 243, with new data recovery routines and some minor bug fixes. Binary only. Author: Dirk Reisig

Fred Fish Disk 384

Contact	Demo version of a "pop-up" program for managing personal contacts. Allows you to keep a name and address list along with phone numbers and comments. Can print mailing labels with a couple of mouse clicks (supports PostScript printers). Names and address can be "clipped" into other programs such as word processors, and Contact can even dial your modem for you. Version 1.0, binary only. Author: Craig Fisher, CMF Software
Elements	Very nice interactive display of the the Periodic Table of Elements. Includes general row and column information, plus a test mode where the program asks specific questions about the selected element or row/column. This is version 2.3, an update to version 2.0 on disk 368. Binary only, shareware. Author: Paul Thomas Miller
NorthC	A freely redistributable programming package containing all the programs required for developing in C. Based on the Sozobon Ltd C compiler, Charlie Gibb's assembler, the Software Distillery's linker, and portions from other sources. Steve has pulled everything together and added some enhancements in the process. This is version 1.2, an update to version 1.1 on disk 353. Changes include extra examples, many bug fixes, further documentation and some improvements. The environment is supplied compressed and unpacks to two disks. Partial source is included. Author: Steve Hawtin, Charlie Gibbs, Sozobon Ltd, The Software Distilary and many others.

Fred Fish Disk 385

MortCalc	Yet another loan calculator, but this one was written with accuracy in mind. The monthly payments times the number of months should balance the total principal plus interest, to the cent. Version 2.5, freeware, source included. Author: Michel Laliberte
XLispStat	A statistical program based on David Betz' XLisp. It does some of the most advanced dynamic statistical graphics, included brushing, linking, and 3D rotations. Menus and requestors can be created dynamically with simple lisp commands, and treated as lisp objects, so that the program could be used for many other non- statistical purposes, such as interactive expert systems. XLisp-Stat has an ARexx port so that an editor may be used to prepare lisp programs and send them directly to XLisp-Stat to be executed. Commands, as character strings, may also be sent from XLisp-Stat with the lisp command, "arexx". All graphics produced may be saved to files in IFF format. This version of XLisp-Stat (v.2.1, release 1) has been ported to the Amiga by James Lindsey, from the Mac version supplied by Luke Tierney. Requires a numerical coprocessor (M68881/M68882) and an M68020/M68030 processor. This disk contains the executables, manual, and lisp files. The sources can be found on disk 386. Author: David Betz, Luke Tierney, James Lindsey

Fred Fish Disk 386

Statpack	Demo version of a statistics and data manipulation program. Version 3.2, binary only. Author: James Lindsey
XLispStat	A statistical program based on David Betz' XLisp. It does some of the most advanced dynamic statistical graphics, included brushing, linking, and 3D rotations. Menus and requestors can be created dynamically with simple lisp commands, and treated as lisp objects, so that the program could be used for many other non- statistical purposes, such as interactive expert systems. XLisp-Stat has an ARexx port so that an editor may be used to prepare lisp programs and send them directly to XLisp-Stat to be executed. Commands, as character strings, may also be sent from XLisp-Stat with the lisp command, "arexx". All graphics produced may be saved to files in IFF format. This version of XLisp-Stat (v.2.1, release 1) has been ported to the Amiga by James Lindsey, from the Mac version supplied by Luke Tierney. Requires a numerical coprocessor (M68881/M68882) and an M68020/M68030 processor. This disk contains the sources. The executables, manual, and lisp files can be found on disk 385. Author: David Betz, Luke Tierney, James Lindsey

Fred Fish Disk 387

BlitterSand	An interesting cellular automata program that gets its roots from a "sandpile". Intriguing to watch. Includes assembly source. Author: Mike Creutz
ExtFuncProc	External Function Process. Allows execution of any library function from simple tasks even if these functions require a process environment. For experienced programmers only because there isn't any documentation written yet but only an example. ExtFuncProc is used by GMC. It runs under KS 2.0. Binary only. Author: Goetz Mueller
GMC	A console handler with command line editing and function key support. GMC provides extended command line editing, function key assignment in four levels, extended command line history, online help for functions in the handler, and an iconify function. This is version 9.2, an update to version 4.0 on disk 291, with many new features, including an output buffer (dump to printer and window), filename completer, script function, undo function, prompt beeper, pathname in window title, close gadget for KS 2.0, etc. Shareware, binary only. Author: Goetz Mueller
H2I	Translates C include files into assembler include files. Useful for programmers that use both C and assembler code in the same program. Helps to keep the structure definitions consistent. Version 1.1, shareware, binary only. Author: Goetz Mueller
MandAnim	A Mandelbrot Animation program that allows you to easily generate series of lo-res/16-color pictures. Features full mouse and/or keyboard operation, zooms, auto-save, high (cheat) speed, iconization, etc. The generated pictures all remember their positions and settings so they can be re-loaded. Version 1.1, binary only. Author: Ekke Verheul.
MandelBlitz	Very fast Mandelbrot plotter with lots of handy functions such as color cycling, zoom, special palette control, file requestors and more. Version 1.0, binary only Author: Nico François
Menu	A fast-access menu system configurable via a script file that allows the user run selected programs. Version 2.0, binary only. Author: Stefan Mömhag
NTSC-PAL	Two programs that give A500/A2000 owners with the new ECS 1Mb Agnus installed the ability to boot into either a NTSC or PAL environment. "Very" useful for both NTSC and PAL owners alike. Version 1.1, includes assembly source. Author: Nico François
Wreq	Replace "pop-up" requestors with line-oriented requesters (similar to those found in an MS-DOS environment) that can be easily handled from the keyboard. If there is no interactive console for the process, the requester won't appear. Includes assembly source. Author: Tuomo Mickelsson

Fred Fish Disk 388

Calc	A shell style, command-line calculator. Calc does not have a fancy keypad display as many other calculator programs do. Instead, it is capable of taking its input from a file, the keyboard, or a command line and output-ting its results to a file or the screen. It can also apply a single equation to all of the values stored in a file (or files). It handles all common mathematical expressions, can optionally predefine physical constants and store variables. Version 2.0, binary only. Author: Bill Dimm
DClock	A "Dumb Clock" utility that displays the date and time in the Workbench screen title bar. This is version 1.27, an update version 1.12 disk number 325. Many more useful enhancements/bug fixes, including an ARexx interface. Includes source. Author: Olaf Barthel
DIEd	A full-screen ANSI editor including an animation utility. Provides PAL and NTSC compatibility. Many useful features such as horizontal and vertical block cut/pasting operations, line/block/screen centering, save defaults and more. Version 2.4, binary only. Author: P-E Raue
Free	Display how much free space (bytes or blocks) you have on any or all of your mounted disk volumes. Runs from CLI only. Based on "Free" by Tom Smythe on Fish Disk 66, but totally rewritten and enhanced. Version 1.01, includes source. Author: Daniel Jay Barrett
KeyMapEd	Allows you to change the KeyMaps used with SetMap. This is a full featured editor providing support for normal, string and dead keys. The keyboard represented is from an A3000/A2000/A500 but it is fully compatible with A1000 keyboards. This is version 1.1i, an update to version 1.02 on disk number 193, binary only. Author: Tim Friest
SnoopDos	A utility for monitoring AmigaDOS calls. In particular, it allows you to see what libraries, devices, fonts, environment variables or startup files a program is looking for. Very useful when you're trying to install a new application. Version 1.0, includes source in C. Author: Eddy Carroll

Fred Fish Disk 389

Kick	Another screen hack, specifically for A500/A2000 owners. I don't want to spoil any surprises but reportedly causes some machines to crash. Binary only. Author: Tony Solomon, Paul Fortin
Plot	A 3-D function plotting program with provisions for coordinate translation on both axes, parametric equations, and standardized notation of the pow function (x^y — which now works as specified.). This is version 5.1, an update to version 4.1 on disk 175, with some enhancements and bug fixes. Binary only. Author: Terry Gintz
PolySys	An extended version of the 0L-system (string rewriting) described in The Science of Fractal Images (edited by Pietgen and Saupe). The basic algorithm has been expanded and modified extensively, and looping commands similiar to those found in other Turtle graphics systems (Logo, etc) have been added. Support for three-dimensional drawing, with perspective, is also included. Version 1.0, binary only. Author: Terry Gintz
Retab	Useful command-line "tab-to-space" and "space-to-tab" expansion utility. Several command-line options to specify size/settings and the ability to protect material enclosed by delimiters (quotes, brackets, carats, etc.) from expansion. Version 1.03, binary only. Author: Paul Klink
ZPlot	Graphs formulas based on 4-D complex number planes. ZPlot currently supports the Mandelbrot set, Julia sets, and Phoenix curves, with over 500 mapping variations. The math functions supported include sin(z), sinh(z), z^z, e^z, z^n, sqrt(z), cos(z), cosh(z), tan(z), tanh(z), log(z), ln(z) and n^z. Version 1.3d, binary only Author: Terry Gintz

Fred Fish Disk 390

Flip	Allows you to quickly and easily switch between various screens. Can close screens, pull them up, and activate windows. Has the unique feature of sorting screens in a way that all title bars are visible at one time. This is version 2.0, binary only. Author: Lars Eggert
ReadmeMaster	A nifty little database for finding those programs that you know exist somewhere (???) in the AmigaLibDisk library. Maintains a keyword dictionary of the Contents descriptions that allows searching by disk number, program title, author's name, or some other descriptive word. Currently supports disks 1-360, an update to the version on disk number 163. Binary only. Author: Harold Morash
SetClock	A utility to set or read the hardware clock on a Spirit Technology memory expansion board. Works in a manner similar to the SetClock utility which is supplied by Commodore with Amigas that have hardware clocks as standard equipment. Includes source in PCQPascal and assembler. Author: Willi Kusche
SM	Small utility to center the display. Recoded version of "ScreenShift" by Anson Mah (Disk 88), only half the size. Includes source. Author: Anson Mah, Lattice V5.04 recoding by Oliver Wagner

To Be Continued......

In Conclusion

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THE NEED FOR A NATIONAL AMIGA USERS ASSOCIATION

SOMETIMES A SINGLE VOICE CAN PRODUCE results that render historical events. In most cases, however, it seems that many voices banded together can make a much greater impact. Like you, I have heard the rumors of the new computers from various other manufactures (other than Commodore Business Machines). These rumors weigh heavy on my mind. Have I got the right computer, will it do all that I want it to do, or are the other guys supplying the better answer?

In an attempt to find out what is going on, I decided to visit a few different computer stores just to see if the advertising was a small voice or a combined power voice. I was amazed: the other computers were for the most part slow, and they didn't have a great quantity of software. I found that there were several titles all doing the same thing, while the cost for the most part was much higher than the Amigas. I specifically asked about products for multimedia, many of the sales people claimed that they had these products. However, when pressed for a demo they fell short of the mark. They either didn't have the software or weren't capable of giving me a demonstration of these alleged new powers.

THE VOICE THAT THE AMIGA HAS IS NOT BEING HEARD, AND WE NEED TO TURN UP THE VOLUME.

As the day came to a close and the fuel tank in my car became depleted, I realized that the real story of how powerful the Amiga computer really is has not made it to the masses. Wouldn't each of the sales people, that I spoke with, be surprised to see the power of a multitasking computer that deals with visual communications as easily as a bird does flying.

The voice that the Amiga has is not being heard, and we need to turn up the volume. It is incumbent on each of us to let the other guys know that we have a real power base of hardware and software that makes the others pale by comparison. The Amiga may have not sold as many units as the others have, but the reality is that the Amiga has delivered on the promise of being the computer for the creative mind.

We can help the cause. It is time to join our voices in one song. I am asking each of you who take the time to read this open letter to send a SASE for more information about the Amiga Developers Association (ADA) and the National Amiga Users Association to Impulse, Inc. (address follows) You can become a member of the first national computer organization dedicated to the promotion and continuation of the computer platform, namely the Amiga. With your help the National Amiga Users Association can attack several problems that are present in the market.

1. Let business men and women know that there are other ways of communicating ideas and concepts with the use of the Amiga. No more slide projects, use multimedia to convey the bottom line.
2. Help Commodore reach a greater awareness through other formats of the media, that have not seen or been told of the power of the Amiga.
3. Assist dealers with training tapes and hypermedia demos that show the power of the Amiga to potential buyers.
4. Create a clearing house for users who have problems and need help either with hardware or software related concerns.
5. Position our group in a positive light with Commodore and take advantage of the unique investment opportunities that exist for all of us.
6. Set up a grant program for new developers to help them bring better products to market.
7. To take full advantage of the new technologies coming: CD ROM and Video Networking.
8. To make our combined voice heard throughout the world. To make a difference.

Become part of a positive solution, help yourself and your friends grow in the Amiga marketplace. Let's get more and better products for this "power" computer, the Amiga. The success of this notion is based entirely on your involvement. Show your support for the Amiga by joining our forces today.

Send SASE for more information to:

National Amiga Users Association
c/o Impulse, Inc.
6870 Shingle Creek Parkway #112
Minneapolis, MN 55430
Attn. Mike Halvorson

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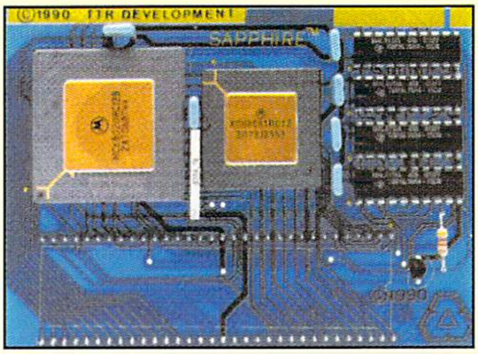

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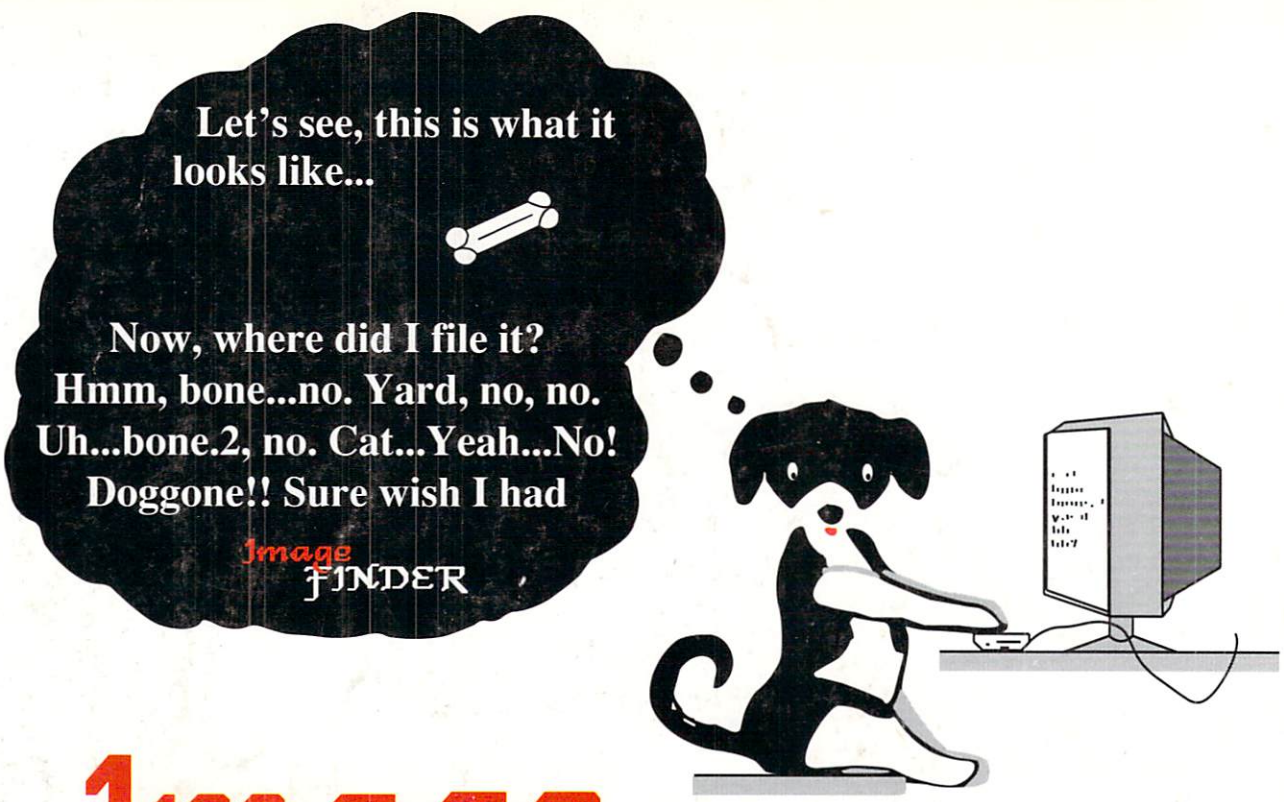
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